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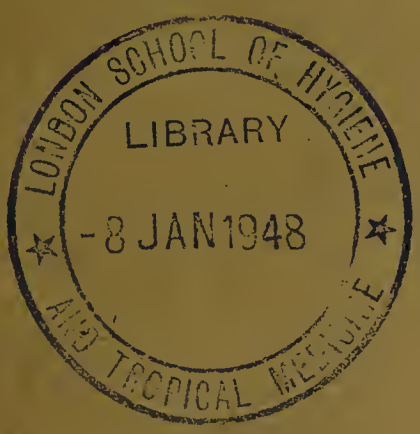

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1946

BY

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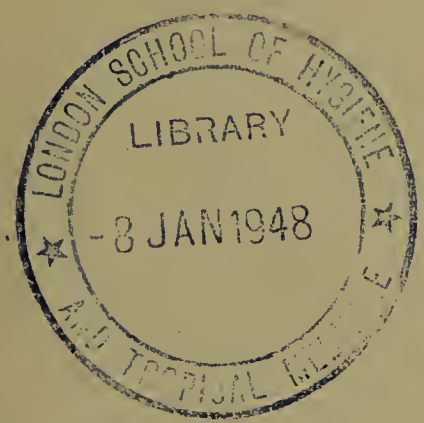

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PART I

THE PRE-WAR PERIOD

1—Introductory

This is the first occasion on which the annual report for the Island of Singapore has been published. Prior to the year 1942—the year of the Japanese Occupation—the Departmental report covered the whole of the Malay Peninsula and Singapore. Under the constitutional proposals introduced on 1st April, 1946, Singapore became a separate colony. This report attempts to give a picture of the fluctuations which have occurred since the Japanese Occupation to the end of 1946. It covers the period of the British Military Administration from September 1945 to April 1946—a period of urgent improvisation and rehabilitation following the liberation, with a review of the progress made since the advent of the Civil Government on 1st April, 1946.

Singapore is an Island Colony of some 220 sq. miles, joined to the Malayan mainland by a causeway. It enjoys a relatively good climate in spite of its proximity to the equator, with a high average humidity of 84% and a uniform temperature of 80° to 90° F. There is no real dry season, but during the North-East Winter Monsoon rainfall is considerably increased. The Island is flat and there are no hills of any consequence.

The Medical Services are controlled by a Director, with a Chief Health Officer and Chief Medical Officer. While the health services of the urban area of Singapore city are under the direction of the Municipal Health Officer and a Municipal Commission, the Government Medical Department is in charge of the hospital organisation, the port and the rural health division.

It is pleasing to be able to record that medical observation indicates a general and real improvement in the public health since the liberation in September 1945, in spite of the difficulties which have been experienced in rehabilitation and reorganisation since that date. This statement must be accepted as a relative one, however, as there is no doubt that preventive medicine was grossly neglected by the Japanese, while curative treatment was continued by the Government Asiatic Staff without adequate assistance from the Enemy Occupying Authority. Thus infantile and adult deaths mounted as such diseases as malaria became common. A reference to the vital statistics section will make this sufficiently clear. During what may be termed the Japanese Period (1942—1945), 130,382 deaths were recorded as compared with 59,361 over a similar span in the years 1937—1940. During the bad years the number of female deaths was apparently half the male. If the difference was due to execution or massacres no records are available to show this. Dr. Lucius Nicholls in a short study of the relevant vital statistics has noted that "during the four months July to October 1944 when the recorded deaths were more than three times as numerous as in the years before the war the number

of executions are given as seven. Further the causes of all deaths are given and the consistency of the rise and fall of the figures under each heading is such as to indicate that they were not loaded with the deaths from violence.

"The deaths among *females* during the years 1937 to 1940 were 23,765 but the figure rose to 43,685 during the years 1942 to 1945. Also whenever there was a marked rise of the deaths of males, there was likewise a rise of the deaths of females though to a smaller degree; graphs for the deaths in each quarter of the year show similar curves for both sexes. It is concluded, therefore, that the Japanese did not record deaths from war or massacres in the vital statistics of the civil population.

"The increase in the number of deaths among males may be accounted for by the recruitment of men to hard labour and feeding them on deficient diets. The condition of some labour gangs at the time of the re-occupation was ample testimony of this.

"The principal causes of death recorded for the three years 1943 to 1945 are as follows:—

	1943	*1944*	*1945*	*Total*	*1937*
Beri-beri	2,004	6,749	6,659	15,412	653
Infantile convulsions ..	3,166	4,562	3,080	10,808	1,792
Pneumonia	2,077	4,249	2,379	8,705	1,851
Tuberculosis	2,282	3,338	2,764	8,384	1,382
Dysentery	460	2,977	1,719	5,156	200
Malaria	680	1,886	2,771	5,337	428
Unspecified fevers	1,722	3,659	3,298	8,679	706

"The vital statistics for the year 1937 are fairly typical of the years before the war, and the last column is for a comparison with what occurred during the Japanese Occupation.

"Beri-beri heads the list of causes of death. It is due to deficiencies in the constituents of the diet especially when the diet is overloaded with carbohydrates. The term beri-beri is somewhat loosely used; in one form of the disease there is swelling of the lower extremities and other parts of the body, but this type of swelling also occurs when there is insufficient protein in the diet, and in this case the terms nutritional oedema, famine oedema or war oedema have been used. But these terms do not appear in these reports on vital statistics; and as nutritional oedema so frequently follows diets consisting mainly of roots it may be concluded that deaths from this cause have been included under the term beri-beri.

"The second highest cause of death is infantile convulsions, and this is indicative of malnutrition among infants under one year of age; because when poorly fed women are unable to suckle their infants, and cannot obtain milk, the figures under this heading are always high.

"The death rates from pneumonia and dysentery increase when the diets are inadequate in quantity and quality.

"The rise of malaria and 'unspecified fevers' in the years after 1942 speaks of another matter, namely the failure of the Japanese to maintain the anti-malarial works for which Malaya has so long been famous.

"Doubtless an inadequate supply of drugs played a part in the deaths from infectious diseases. But the greater part of the picture conveyed by the mortality records is of deterioration of the feeding of the people after 1942, when their diets became more and more meagre and of poorer quality."

This is a summary which is borne out by observers like myself who had opportunities of studying the nutritional and health state of the population on the return of the British. Every effort was made then to treat the people *en masse* and to provide a full diet for all the sick and ailing on whom we could put our hands. The following were the results:—

	Sept. 1945	*Oct. 1945*	*Nov. 1945*	*Dec. 1945*	*Jan. 1946*	**Average for previous 20 months*
Beri-beri	412	340	179	154	132	636
Dysentery	87	132	58	24	20	224
Convulsions	236	259	212	208	156	350
Tuberculosis	241	277	220	205	200	305
Pneumonia	184	175	125	129	131	309
Malaria	281	317	129	126	77	204
Fevers (unspecified) ..	245	297	187	157	131	315

A reference has been made to the fact that the Asiatic medical and nursing staffs remained at their posts during the Enemy Occupation. No praise can be too high in this connection. Some hospitals and child welfare clinics were kept in operation and every effort was made to maintain some sort of preventive and infectious disease control. The Acting Chief Health Officer, Singapore (Dr. Johnston) and the Acting Chief Medical Officer (Dr. Scrimgeour), who were internees during the period, report as follows in this connection:

* During the Japanese Occupation.

PART II

The War Period

REPORT OF THE ACTING CHIEF MEDICAL OFFICER, DR. H. SCRIMGEOUR, AN EX-INTERNEE

2—The Hospitals in War Time

Prior to the outbreak of war with Japan in Malaya on 8th December, 1941, the General Hospital and Tan Tock Seng Hospital were hospitals for acute cases and Kandang Kerbau Hospital was a maternity hospital. Plans had been made for converting all three for the reception of war casualties in the event of war. The Japanese opened their attack on Malaya with a bombing raid on Singapore in the early hours of 8th December, 1941, causing a large number of casualties amongst the civilian population. It was not until the end of December, 1941, that further bombing raids were made on Singapore, which continued with increasing frequency and intensity until the capitulation on 15th February, 1942.

It was in January, 1942, that the hospitals began to be severely taxed with air-raid casualties and wounded from the fighting forces, and soon Raffles College, St. Andrew's School and Outram Road School were opened as extra hospitals for wounded. In addition, the Medical Auxiliary Service had established depots where a small number of casualties could be housed, and aid-posts in many buildings throughout Singapore—schools, clubs and other suitable buildings being fully utilised for this purpose. As January progressed and the Japanese forces advanced down the peninsula, hospitals and aid-posts whose staffs had been augmented by medical officers, sisters, nurses, dressers and Medical Auxiliary Service personnel retiring from up-country were found to be working at high pressure. The Medical Auxiliary Service organisation had opened canteens in the hospitals and Medical Auxiliary Service depots, and the staffs of the canteens worked long and arduous hours providing light refreshments for staff, patients and refugees and, in the larger hospitals, cooking meals to help the kitchens. In the General Hospital some eight thousand persons, patients, staff and refugees, were fed daily.

When the Japanese forces reached Johore Bahru, they began to shell Singapore and in February air-raids continued day and night. The continual bombing and shelling increased the stream of wounded pouring into aid-posts, depots and hospitals, and soon the hospitals were literally crammed with wounded, civilian and military. The General Hospital, with normal accommodation for 830 patients, found itself at the end of the fighting with some 3,500, of whom 1,100 were service casualties and 2,400 civilian casualties.

The Japanese forces landed on the island from the mainland on the morning of the 9th February; and from then onwards, as their pincers closed on the town, the work of the hospitals and aid-posts became progressively more difficult. The shelling and bombing and general turmoil of war taxed the morale of the staff to its utmost, and it can be safely stated that the personnel of the Medical Services came through this strange and terrifying ordeal with remarkable courage, calmness and devotion to duty.

As the fighting line advanced on Tan Tock Seng Hospital and Woodsville Hospital (in St. Andrew's School), both had to be evacuated. The patients from Tan Tock Seng Hospital were evacuated to the General Hospital and Outram Road Gaol, and from Woodsville Hospital first to Victoria School on 13th February, then to Outram Road Gaol on 14th February. Outram Road Gaol had discharged its prisoners and during the last few days was used as a hospital. After the Japanese had captured the MacRitchie Reservoir, the hospitals were cut off from water supply and the effect of this was paralysing. The disposal of the dead became very difficult and hundreds had to be buried in a mass grave in the grounds of the General Hospital. On 13th February, sisters and nurses were given permission to leave the island if they wished, and many lost their lives on the ships leaving Singapore in the last few days of the fighting, since the Japanese planes were incessantly bombing the docks and all shipping leaving the docks, and ships out in the Straits of Malacca.

In the last week the hospitals were surrounded by our guns and consequently Japanese shells landed in the hospitals, causing casualties. In Kandang Kerbau Hospital Dr. Norris, Dr. Sinha and a midwife were killed by a shell. At Tan Tock Seng Hospital a medical student was killed by a shell and during his burial in the grounds of the General Hospital the following day a shell landed on the funeral party, killing eight other medical students. Other hospitals had casualties from shell fire.

On the evening of 15th February, 1942, Singapore capitulated. The General Hospital then discharged 1,100 military casualties to the military hospitals; 1,600 civilian casualties were sent to their homes; 800 civilian casualties were transferred to the Mental Hospital. Mental patients had been transferred to St. John's Island before the capitulation.

The Japanese occupied the General Hospital on 18th February, 1942, using it for their casualties. The General Hospital became the main surgical hospital for South-East Asia—the upper block being taken over by the Military and the lower block by the Japanese Navy, each under a separate administration. Kandang Kerbau Hospital remained as the Civil General Hospital throughout the Occupation. For the first year of the Occupation, Tan Tock Seng Hospital was used by the Japanese as their medical hospital, but about the middle of 1943 the civilian patients from the Mental Hospital were transferred there and Tan Tock Seng then became a civil hospital. The Mental Hospital was used as a hospital for Japanese convalescents after the middle of 1943, and the Alexandra Military Hospital was then used for their medical and shell-shock cases.

The Period of the Japanese Occupation

The account of this period records only items of medical and health interest as they affected the European and Eurasian civilians who were interned by the Japanese.

After preliminary internment in quarters on the sea front in the Katong area, the internees of both sexes were marched to Changi Prison on 6th March, 1942, in the heat of the day, a distance of some eight miles. At the start, 2,500 internees were thus confined to Changi Prison, built to house 600 prisoners. In a week or two, as more internees were brought in, the number increased to over 3,000. Internees were housed three in each cell. Europeans employed by the Municipal Health Department, Water Works, Power Station and Fire Brigade were kept outside until the Japanese could take over proper control.

Civilian sick and wounded were left at the Mental Hospital, called Miyako Hospital by the Japanese, and one medical officer, one surgeon and one eye specialist, all European, were permitted to remain at Miyako Hospital to look after them until the middle of 1943.

Changi Gaol—a large modern prison—was divided into four blocks—A, B, C and D Blocks. All the women and children occupied A Block, while the men occupied the other blocks and there was no free communication between the men's blocks and the women's block. There was an ample water supply and the sanitation was water carried, there being one "squat" latrine in each cell. The big modern kitchens were able to cope with the cooking for all internees but wood had be to burned to heat the boilers instead of oil, as was the usual practice in peace time.

There were 106 doctors interned in Changi Prison. The prison hospital was a small, two-storied building of 40 beds, on the men's side, with a small operating theatre adjacent. Medical officers and surgeons were appointed to look after this hospital, while each block opened a dispensary with two medical officers in attendance. A Camp Health Officer was appointed for the prison as a whole, and each block had one health officer under him. They dealt with ordinary health measures. The women's block had a similar arrangement, though they had no proper hospital but improvised one in a small block for European prisoners. For some time all the more serious cases were sent by ambulance daily to Miyako Hospital, and only the milder cases of illness were treated in the prison hospitals.

It soon became apparent that the quality and the amount of food provided for the internees were to take paramount place in the concern of the European Camp Administration and were to be the deciding factors in survival. A Medical Advisory Committee was formed to regulate the amount and variety of meals provided and to advise on the composition of meals according to the foodstuffs available. The prison had gathered a large stock of tinned foods of all kinds and an invaluable stock of marmite and, at the beginning, the Japanese supplied ample stocks of polished rice. For a few months internees were treated to a very adequate amount of food daily but no fresh food or fresh fruit was available. After about three months, during which period a mild epidemic of dysentery occurred in the prison, many internees developed oedema, which was regarded as a manifestation of beri-beri, and some neuritic cases occurred. This responded to marmite and injections of Vitamin B_1.

After this outbreak the Japanese authorities were persuaded to do something to improve the standard of food; and for some months rice polishings, fresh meat, vegetables and fruit were provided, and other fresh food, such as eggs and coconuts, made available for purchase. For a time, the general health of internees improved considerably but the supplies of fresh food were gradually reduced and stopped at the beginning of 1943. It was then that the health of internees deteriorated further, and early in 1943 amblyopia made its appearance, affecting about 120 internees. The amblyopia, in many cases, was complicated by neuritic symptoms. As time went on the health of the internees generally deteriorated and the hospitals and block dispensaries had to deal with all kinds of troubles due to food deficiency, in addition to ordinary illness. A prison garden worked by internees outside the camp provided some fresh vegetables daily. Acutely ill patients continued to be sent to Miyako Hospital until 10th October, 1943, after which date all cases, medical and surgical, had to be dealt with in the Changi Prison Hospital.

On 1st May, 1944, internees were moved from Changi to Sime Road Camp. This camp was situated beside Bukit Timah Golf Course and had been an R.A.F. camp before the war but most of the huts had been burned down or

damaged during the fighting and had been repaired by our troops who had been interned there. The internees found a collection of dilapidated, dirty huts, and were packed into these in a condition of squalor. The change to the open air from the grim walls of Changi Gaol had a beneficial psychological effect on most internees. By then, however, the food situation had become grave. Rice and vegetable soup thrice daily was the staple diet and the calorie value was dangerously low, apart from the gross deficiencies in vitamins, protein and mineral salts. The majority of internees had lost much weight in Changi but in Sime Road Camp loss of weight was progressive. Gardening, which was compulsory to all intents and purposes, was introduced, and on a deficient diet of an alleged 1,400 calories daily the health of the camp reached a seriously low level. On top of the loss of weight and strength serious deficiency diseases became rampant. Ulcers were the order of the day, and accidental scratches and abrasions were viewed with grave apprehension. Pellagrinous skin conditions appeared in many and other signs of disease due to deficiency of the Vitamin B_2 complex appeared, causing many cases of peripheral neuritis.

The camp hospitals, which were ordinary huts, became crowded. The long lallang (coarse grass) which grew in the camp and which was infested with rats led to 32 cases of tropical typhus, with 6 deaths. The diabetics who had survived a precarious existence in Changi on an unsuitable diet with insulin now found themselves with no insulin, and all died.

The position of drugs for the camps had always been difficult. Many doctors and pharmacists going to internment in Changi took supplies of drugs with them and much economy in their use was necessary. In early 1944 the Japanese began to supply some drugs but they were never nearly adequate or the type that was asked for. Practically no anaesthetics were supplied and operations were mostly done in camp under local anaesthetic, percaine being the one used. Spinal injections of this were made in the camp dispensary. The camp chemists used their ingenuity in assisting the drug position. Salt water was evaporated. Pure sodium chloride was made from the crude salt and magnesium carbonate was made from the mother liquors of the salt evaporators. In Sime Road Camp, Cassia Alata, popularly called "Cats' Whiskers", was grown and used as a mild purgative—known as *galenggang* in Malay. Hydrocopele Asiatica—known in Malay as *pegaga*—grew in Sime Road Camp and was used as a diuretic but not with very good results. Kaolin was found in Sime Road Camp and was purified for use and was the only treatment for dysentery for a long time. Wood-ash was washed and sifted and used as an antacid and as a tooth powder. Rubber-nuts were used in cases of Vitamin B_2 deficiency with good results. The nuts were commonly cut up and heated to drive off the prussic acid. Many internees ate them raw but they were rather apt to make the consumers sick. Rubber trees were tapped every morning and the latex, mixed with an ammonia solution, was used to fix small pieces of gauze over small dressings on ulcers. This was very satisfactory and extremely economical when bandages were in such short supply. The supply of quinine, obtained from Java by the Japanese, was always in good supply for the needs of the camp.

The critical condition of the camp, now numbering 4,500, came to an end with the Japanese surrender. At the end of August, 1945, British Paratroops arrived in camp for the first time, and after this food flowed in, chiefly in tins. This supply of unaccustomed rich food led to quite a lot of "protein oedema" amongst internees.

In reviewing the internment period, several impressive facts should be recorded. The Japanese authorities were very keen on having the internees vaccinated and inoculated against typhoid once each year, and this was done.

There were no serious epidemics and credit for this was due principally to the careful, scrupulous work of the health officers. Apart from some cases of B.T. malaria in Sime Road Camp, the Camp was fortunate in escaping any serious outbreak of malaria. The death rate was not unusually high. Many serious major operations were performed with success, under conditions of extreme primitiveness and with all kinds of improvisation.

The medical staff of the camp carried out its work with a success that was highly commendable in conditions of the greatest difficulty.

REPORT OF THE ACTING CHIEF HEALTH OFFICER, DR. R. S. JOHNSTON, AN EX-INTERNEE

3—Work Carried out by the Government Health Department during War Time

From December, 1941, until the Japanese landed on the Island on 8th February, 1942, this Department maintained all Health measures in the Rural Areas and, in addition, undertook the following important measures:—

(*a*) An intensive anti-typhoid campaign was instituted to deal with the dangers which might arise through failure of the main water supply. During the month of January, 1942, alone, some 170,000 persons were inoculated against this disease. All Medical or Health Officers who were evacuated from up-country and attached to this department assisted in this work.

(*b*) A "Burial of the Dead" squad was formed consisting of the Deputy Chief Health Officers, Health Officer Rural, Chief Sanitary Inspector and a roster of clerks, who maintained a continuous liaison with the A.R.P. Headquarters during the twenty-four hours. When an incident occurred, this was dealt with by the local District Squads. Co-operation with the Municipal Health Department which was in charge of the Municipal Area, the Registrar of Births and Deaths, Singapore and the Registrar of Vehicles (who was the Competent Authority for requisitioning vehicles) was maintained.

(*c*) The seven districts in the Rural Area had their own A.R.P. organisations. Burial grounds were sited and 100 emergency graves opened up in each area in order of nationalities. Temporary mortuaries were also prepared in all districts. The burial grounds were for unclaimed bodies. The dead were taken to the temporary mortuaries and there identified by their relatives who took them for burial. In all, only five unidentified and unclaimed bodies were buried by the Government Health A.R.P. organisation.

(*d*) Twelve weeks prior to 15th February, 1942, major anti-malaria work was being carried out for the Services in the following areas:—

(i) Tengah Aerodrome completion of $240,000 scheme,
(ii) Khatib Aerodrome commencement of $175,000 scheme,
(iii) Boom Defence completion of $20,000 scheme and
(iv) Oiling of all areas under temporary control.

(*e*) Owing to indiscriminate excavations for Air-raid Shelters in *highly malarious* and swampy areas, the anti-malarial work in Singapore Island was brought under unified control, and the Government

Health Department placed a Health Officer in charge to act in liaison between the Municipal and Government Health Departments. Five hundred extra labourers were employed to fill up dangerous malaria excavations throughout the town and bomb craters.

(*f*) Some of the Health Nurses previously attached to school health work and maternity and child welfare work with the district midwives and female attendants were switched over to hospital work, and put in charge of temporarily displaced women and children at the various temporary centres at Poh Leung Kok, C.E.Z.M. School at Sophia Road, etc., arranged by the Lady Medical Officer and the Public Health Matron. Others who remained in their districts carried on their midwifery work and assisted in the anti-typhoid campaign.

(*g*) In addition, some of the office staff were attached to the fire-fighting squad in charge of the Fullerton Building.

(*h*) *St. John's Island*

(i) A few days after the outbreak of the war, Japanese internees from Singapore and Johore were sent to the Quarantine Station, St. John's Island. Before 25th December, 1941, the male internees were transferred to Changi Prison and later, the female internees were all transferred en route to India.

(ii) The inmates of the Mental Hospital at Yio Chu Kang Road were sent to St. John's Island where they remained until the end of April, 1942. The Medical Staff of that hospital were in charge of these inmates and were assisted by the staff of the Quarantine Station.

Work of the Health Department during the Period of the Japanese Occupation

The day after the capitulation of Singapore on 16th February, 1942, the Health Officer, Rural, was ordered by a Japanese Officer to organise a Rural Health Unit for carrying out Public Health measures in all areas of Rural Singapore. The Health Officer, Rural, was appointed Chairman of the Rural Health Unit, and the Chief Sanitary Inspector to assist him in the organisation.

2. The Health Officer, Rural, immediately got in touch with as many of the former local employees of the Government Health Officer as possible and two locally-appointed Health Officers were recruited by him for service. Public Health work, particularly anti-malarial work, continued uninterrupted during the course of the Occupation.

3. During the months of July, August and September 1942, a special anti-malarial campaign was instituted on the advice of these officers. Many labourers were engaged; as a result of this, the incidence of malaria on the Island was reduced to a minimum.

4. These Officers continued in these duties until the 10th June, 1943, when they were interned. The responsibility of carrying out all the work of the Rural Health Unit then fell on the shoulders of two locally-appointed Health Officers and the Senior Sanitary Inspector.

5. On 3rd March, 1944, two of the locally-appointed Health Officers were arrested by the Military Police for anti-Japanese activities. On their release in June of the same year, the responsibility for the carrying out of Public Health Work had to be entrusted to junior officers. Malaria increased slightly.

6. Clerical duties of the Rural Health Unit were ably carried out by one chief clerk and four capable assistants; and due to the latter, the work was satisfactorily performed.

7. The Rural Health Unit was responsible for the following functions in the Rural Areas of Singapore:—

(*a*) Anti-Malarial Work.
(*b*) Scavenging and conservancy.
(*c*) The prevention of epidemics and infectious diseases.
(*d*) Pest Destruction.
(*e*) Licensing.
(*f*) School Health.

8. There was no Port Health or Quarantine work carried out during the Occupation.

PART III

The Immediate Post War Period

REPORT ON THE ACTIVITIES OF THE MEDICAL DEPARTMENT, SINGAPORE, DURING THE BRITISH MILITARY ADMINISTRATION OF MALAYA

4—The Period of the British Military Administration

The civil population was exceedingly under-nourished, malaria was rampant, beri-beri and other conditions due to malnutrition affected a considerable number of inhabitants of the Island.

Although the Japanese had done a certain amount of medical work, a great deal of important preventive and curative treatment had been grossly neglected.

The work of the health nurses, both urban and rural, and the Chinese Lady Medical Officer in charge of them, is worthy of special mention in the welfare field during the Occupation Period and after. On the advent of the British Medical Administration they continued to play their splendid part, while all hospitals and clinics available were rapidly organised on an emergency basis to reach as many of the neglected population as possible. The work was exhausting and arduous in the extreme, as local medical and nursing staffs, though enthusiastic to a degree, were tired and needed recuperation.

On taking over, the Medical Department was severely handicapped by the occupation of the large General Hospital by the military. Other arrangements of a temporary nature had to be made. Shortage of accommodation due to the influx of military personnel, refugees and others who came to Singapore for security made emergency measures very difficult.

Tan Tock Seng Hospital continued to be used to capacity. From 5th September, 1945 to April, 1946, 7,783 patients were treated in this hospital and 27,755 received treatment in the out-patient department. The hospital housed an average of some 750 in-patients.

Kandang Kerbau Hospital, which in pre-war times was used for maternity cases only, had to be employed for the treatment of general medical and surgical cases. 350 beds were continually in use, and 5,131 patients received treatment, including 512 dental and 212 gynaecological patients. The out-patients numbered 87,936.

Tan Tock Seng Hospital and Kandang Kerbau Hospital were used for acute cases over this period. A large Government school in the centre of the town was converted into a temporary hospital, and this *Victoria Hospital*, which opened on November 6th 1945, with 200 beds, treated 750 patients.

St. Andrew's Hospital: A small Mission Hospital of 60 beds was also taken over by the Government for the treatment of suitable cases. During the period under review 652 patients were admitted and 6,819 were treated in the out-patient department.

A Convent School in Katong was taken over and converted into a Tuberculosis Hospital for 200 patients. During this period, since its opening on 26th November, 1945, 391 patients were treated there.

A children's *Orthopædic Hospital*, previously run by St. Andrew's Mission, was re-opened and equipped and had 60 beds. It treated 44 patients from its opening on 20th March, 1946, to the beginning of April, 1946.

Middleton Hospital for infectious and contagious diseases was continued as an extension to Tan Tock Seng on 5th September, 1945, with 250 beds, and 976 cases received treatment in the seven months under review.

A small hospital in Mandalay Road and a Chinese temple in Kim Keat Road were used to relieve the congestion in the main hospitals by supplying accommodation for old, decrepit, destitute and mental people.

Mental Hospital, which had been used by the Japanese for cases which otherwise would have been treated in the General Hospital, was used partly by the R.A.F. and partly for sick Japanese P.O.Ws. There was no accommodation for mental cases as such.

Venereal Disease: This problem presented unusual features in view of the employment of prostitutes by the Japanese and the lack of any treatment facilities during the Occupation.

Facilities for the treatment of venereal disease were provided at the following centres:—

(1) Clinic and hospital accommodation in Middle Road Hospital. The Clinic and Hospital were opened for males on 18th October, 1945, and for females on 29th October, 1945.

(2) Clinic at Kreta Ayer was opened for men and women of all nationalities on 18th October, 1945.

(3) Ablution Centres at Kreta Ayer and Joo Chiat Road were opened on 18th October, 1945, and 20th October, 1945, respectively.

Since the opening of the Clinic and Hospital in October, 1945, the total numbers of new cases treated up to 31st March, 1946, were as follows:—

	Males	*Females*	*Total*
Chinese	1,211	612	1,823
Indians	654	42	696
Malays	161	179	340
Eurasians	26	26	52
Others	20	11	31
Total new cases ..	2,072	870	2,942

Of the total number of new cases treated, 801 were admitted to hospital. The in-patients were made up as follows:—

	Males	*Females*	*Total*
Chinese	103	404	507
Indians	59	34	93
Malays	16	143	159
Eurasians	1	26	27
Others	1	14	15
Total in-patients ..	180	621	801

OUT-PATIENTS

Re-Attendances

	Males	*Females*	*Total*
Chinese	5,803	2,018	7,821
Indians	3,614	119	3,733
Malays	622	600	1,222
Eurasians	151	109	260
Others	46	37	83
Total ..	10,236	2,883	13,119

Eight Welfare Workers, from all walks of life, were employed for social welfare work by contact tracing of infected prostitutes, and those reported by the military. These did sterling work in persuading such women to attend the clinic and hospital for treatment and are continuing this most valuable social work.

Close co-operation was maintained with the Military Provost who contacted and brought for treatment by persuasive means 146 women, all of whom were admitted to hospital. A Clinic in the dock area attended to 1,629, while 1,146 attended preventive centres.

Lepers invaded the small institution available for this disease in increasing numbers, until over 400 occupied the 200 bedded hospital in April.

Outside the hospitals, the most important medical work was done in the Child Clinics and Welfare Centres. In the town area seven of these centres were established, with fifteen more in the Rural Areas and on small islands nearby. In addition to those treated by a travelling dispensary, a total of 45,542 persons were attended to in the town centres, and 20,418 in the Rural Areas.

Public Health services were established immediately on taking over, and special attention had to be paid to town cleansing, scavenging, hygiene and sanitation. These were satisfactorily re-organised finally in spite of considerable difficulties, due to lack of transport and to labour conditions, although special attention had to be paid to water purification, which at the end of the Japanese Occupation had deteriorated to a dangerous degree.

Port Health control remained in the hands of the Naval Authority, but the Military Administration with the medical staff of the latter worked in close liaison with the Naval Health Officer to facilitate the carrying out of Port Health work under a Services Port Health Committee.

Malnutrition: On the re-occupation of Singapore it was apparent that a very large percentage of the population was suffering from serious undernourishment. The Medical Department dealt with this problem in association with the Singapore Welfare Council as the Director of the former was Chairman of the latter. This was only one of the many excellent emergency social measures evolved by the latter body. Milk and soup were provided in the Welfare Centres associated with Clinics, and children in schools were given free meals. In the town 84,573 milk feeds were given to infants and 32,263 soup meals to children of pre-school age, while in the schools 250,175 free meals were given. In rural areas where transport difficulties delayed these operations 10,554 milk feeds and 1,464 school meals were supplied. A concentration was made on *feeding* as a medicinal measure in clinics, welfare centres, schools and hospitals. A special Dietary Committee was set up to deal with institutional feeding and its recommendations were implemented.

Malaria: The Japanese appeared to have had little or no scientific appreciation of the excellent anti-malarial measures which had previously made this island famous for its high standard of malarial prevention work. Almost all the permanent work had become useless through neglect. A vigorous campaign was started in the Municipal and Rural Areas, and a total of 417 miles of open earth drains were straightened and deepened, and 11½ miles of permanent drains cleared and repaired by April, 1946, while more than 15 miles of new anti-malarial drains had been dug in the Rural Areas. The number of malaria cases treated in the Rural Areas alone had decreased during the six months from 314 per week to 75, in spite of the expected seasonal increase at the end of the period under review.

School Medical Services were resumed in a small way only, owing to staff and transport difficulties. Special attention was paid to children showing signs of malnutrition and malaria. Over 50,000 children received assistance in this way.

Infectious Diseases: A campaign of vaccination and inoculation throughout the Island of Singapore helped to immunise the population against smallpox and typhoid fever. The number of people vaccinated was 125,535, and the number of inoculations 114,744, and the only serious epidemic during the period of the Military Administration was one of acute anterior poliomyelitis. The following is an extract from the report by Dr. A. N. MacFarlane of the Medical Research Council on this interesting outbreak.

"Singapore escaped the destruction by shelling and bombing which was the lot of many cities during the war years, but during the Japanese Occupation there was gross neglect of the sanitary precautions which had made the town one of the cleanest and most healthy in the Far East. In September, 1945, when the Allies re-entered the town, they found heaps of refuse in streets and yards of blocked drains and sewers in many areas. Improvement in these respects was slow on account of shortage of labour and transport and pre-war conditions had not been restored in March 1946.

"During the last three months of 1945 and the first three months of 1946 the civilian population increased by some 2,000 a week, owing to immigration from Java, Batavia and Sumatra. The service population changed constantly as men went home for demobilisation and a continuous stream of units and ships passed through the harbour and shore stations.

"On 24th January 1946 the Medical Branch of the British Military Administration reported that five Chinese children under 5 years of age suffering from anterior poliomyelitis had been admitted to hospital. This was in excess of the sporadic cases which occurred from time to time and the possibility of an epidemic had to be considered. This disease was made notifiable.

"The Civilian Health authorities issued circulars to medical practitioners, school teachers and welfare centres describing the initial symptoms and stressing the importance of early diagnosis; all cases were sent to the Isolation Hospital. School teachers paraded the children every morning and examined them for coryza, muscular rigidity (nose-knee test) and other symptoms of illness. Temperatures were taken in all suspicious cases. Doctors and medical students visited as many schools as possible daily throughout February. Suspects were referred to a diagnostic team in the civilian hospital. A house-to-house search for cases was instituted. Fifty early cases were visited by a team of nutrition workers who inquired into home conditions and diet. No unnotified cases were discovered by these means and there were only a few suspects among the school children. No direct connection was discovered between the cases, and spot maps showed that they were distributed over the town roughly in proportion to the population with only a few cases in villages

on the Island. Sanitary conditions were unsatisfactory and the military authorities were asked to supply additional labour and transport to assist in cleansing the town. This aid was given.

"When the civilian cases were notified there had been a few service cases in different units. A check on the movements of the patients showed no connection between them. Their visits to canteens, cafés, and cinemas were probably no more frequent than those of the healthy members of the Services. Instructions were issued by all three Services concerning early diagnosis and the enforcement of general hygienic measures. Units where cases occurred were visited and their sanitation and living conditions were found to be satisfactory. Kitchen hygiene was improved where necessary in units, canteens and approved cafés. Advice about ventilation between shows was given to theatres and cinemas.

General Epidemiological Findings

"*Symptomatology:* In about 106 civilian cases the site of paralysis was found to be in the lower limbs in 72% (in 24% upper limbs also were involved), in the upper limbs in 15%, and of the bulbar type in 13%. Many cases showed signs of meningitis at the onset. The higher incidence of bulbar paralysis in Singapore than in Mauritius (13 vs. 2 %) suggested that the virus had quite frequently entered the body by the tonsils or pharynx.

"In the Service cases there was a high incidence of involvement of the medulla and the cervical enlargement of the spinal cord. 10 of 24 cases were so affected and only in 14 cases were the lower limbs involved.

"*Attack rates:* In civilians from 23rd December, 1945 to 23rd March, 1946 there were 134 cases. The population of Singapore Island at 9th February 1946 was estimated as 839,156 by the Food Control Office. The attack rate was thus 0.15 per 1,000. The attack rate in children under 10 years was 0.51 per thousand (126 cases in 247,240 children). These attack rates were lower than the 2 to 3 per 1,000 recorded in other epidemics which suggested that the population was relatively highly immunised.

"In the Services the incidence was higher. Attack rates were obtained for a group of R.A.F. units stationed in Singapore in which the incidence was high.

"*Fatality rate:* Up to 23rd March there had been 6 deaths in 133 civilian and 12 deaths in 48 service cases, giving a civilian fatality rate of 4.5 % and a service rate of 25 %.

"*Age Incidence:* In civilians 90 % of the cases were in children under 5, and 1.3 % in persons over 15 years of age. This low incidence in adults suggested that the outbreak was an epidemic of an endemic disease. The high incidence among adults in the Services was even more striking than the figures suggested when compared with the low incidence in civilian adults.

"*Racial Incidence:* Civilian cases were distributed among Chinese, Indians, Malays and other races (including Dutch refugees) more or less in proportion to the number of these races in the population. All the Service cases were Europeans. Indian troops were not affected though they were as numerous as Europeans in the Army.

"*Sex Incidence:* In civilian cases males were twice as numerous as females. In the Services the incidence rate was greater in females than in males.

"*The Course of the Epidemic*: The number of civilian cases with onset in each week increased steadily from the week ending 29th December 1945 to the week ending 9th February 1946 when there were 24 cases. Thereafter the number of cases decreased. The main part of the epidemic occupied seven weeks from 15th January to 2nd March.

NUMBER OF CASES WITH ONSET IN EACH WEEK

Week Ending

	Dec.	*January*				*February*				*March*			
	29	5	12	19	26	2	9	16	23	2	9	16	23
Civilian ..	1	5	3	12	16	22	24	21	13	1	1	4	1
Services—													
R.N. ..	..	..	..	..	1	4	2	1*	..	..	..	3	..
Army ..	..	..	1	1	..	2	3	1*	..	3	4	..	..
R.A.F. ..	..	..	..	1	2	5*	3	3	3*	2	2	..	1
BECS VD ..	..	..	..	..	..	..	1*	..	..	..	1*	..	..
Total Services ..	..	..	1	2	3	11	9	5	3	5	7	3	1

"The symmetry of the curve suggested a spread of infection by contact, and the lack of case to case spread suggested that there had been a carrier epidemic. The short duration of the main wave suggested that the disease had an incubation period of two to three days, was highly infective, and was affecting a susceptible population.

"*Geographical Distribution of Cases*: The civilian cases were mainly in the most thickly populated part of the town, but spot maps showed an extension north and east in the week ending 2nd February and a few cases to the north and west during the next few weeks. There was no direct conncetion between cases and infection was probably spread by many carriers.

"The Service cases were almost all in Singapore itself and most of the patients in units elsewhere had visited the town within the incubation period."

Quarantine: The Quarantine Station on St. John's Island, which had been neglected by the Japanese, was once more equipped for service, and was soon in full operation.

College of Medicine: During the early part of the period of thc British Military Administration action was taken to trace and collect all existing students. After lengthy negotiations the College buildings were only released to the Government at the end of March.

Refugee Camps and Hospitals: The large influx of Dutch ex-P.O.W. and ex-internees and Javanese and other labour which had been left uncared for on the Island also added very considerably to the supervisory work of the Department. All these people had to be concentrated under serious overcrowding which was a source of constant anxiety.

Medical Auxiliary Service: At the fall of Singapore in February, 1942, some 3,000 trained St. John's and Red Cross workers were amalgamated into the Medical Auxiliary Service, and did magnificient work in attending to the 20,000 casualties suffered by the civil population of Singapore. Available personnel of this unit were again reorganised in order to employ any who could not find employment elsewhere. They did particularly useful service in house-to-house visiting connected with the vaccination and inoculation campaign, the Blood Transfusion Unit, and, in many Welfare Centres, nutritional surveys and malaria control work. Although the Unit was disbanded in April some of the members were absorbed into the Medical Department.

* *One case in Women's Services.*

Stores and Equipment

The preparation of estimates of medieal supplies that would be required in Burma, Malaya, Borneo and Hong Kong on the re-oeeupation of those territories, was undertaken at the War Offiee early in 1944 by a representative committee appointed from the respeetive Planning Units under the ehairmanship of Sir Hubert Young. The eommittee envisaged a period of reeonstruetion eovering two years and, for the purpose of framing the estimates, the requirements were eonsidered in four six-monthly phases. In the first phase, provision was made for the minimum essentials in equipment and expendable stores to enable the Medieal Department to funetion effieiently, having in mind a possible shortage of staff and hospital aeeommodation, also the limited shipping spaee that was likely to be available. Supplies for the seeond phase were to be mainly of an expendable nature for the maintenanee of the Serviee that had been established in the first phase.

In view of the general supply position at that time it was expeeted that the bulk of the supplies would be proeured from Ameriean sourees, and the estimates, therefore, were based on U.S. C.A.D. Lists designed for relief and rehabilitation work in European eountries, suitably modified and supplemented to meet the requirements of Far Eastern territories.

Due to subsequent changes in the military situation in the European and the Far Eastern theatres, supplies eventually were made available from sourees in the United Kingdom, Middle East and India.

Planning by the medieal seetion of the Civil Affairs Serviee (Malaya) was then eontinued in India at Advanced Headquarters, ALFSEA. War Establishments and War Equipment Tables for the various Units were prepared, and indents were submitted for the neeessary personal, unit and teehnieal equipment and for transport. Programming for the shipment of stores and transport followed and, from July, 1945, onwards, Unit transport, equipment and stores from depots in India were assembled at the Civil Affairs Base Depot, Madras, in readiness for on-shipment to Malaya.

The medieal supply system under the British Military Administration (Malaya) originated on the 6th September, 1945, with the establishment of 310 Base Medieal Store, Singapore, with an initial stock of 60 tons of supplies provided by G.H.Q. (India).

For the purpose of administration and supply, Malaya was divided into three zones; the Southern Zone, comprising Singapore, Johore, Malaeca, Kelantan and Trengganu, being supplied from the Singapore Base, while bases for the Central and Northern Zones were established in Kuala Lumpur and Penang respeetively.

Prior to the re-oeeupation of Malaya a "breakdown" of supplies had been made between the three main ports, but this seheme had to be abandoned owing to a deeision to ship all military supplies to Singapore. A "elearing house" was set up in Singapore for the storage, breakdown and despateh of supplies to the loeal and up-eountry bases. This work threw a heavy load on the stores organization and transport and it was found neeessary to employ additional temporary staff and to draw upon the transport "pool".

It is estimated that some 8,000 tons of supplies were imported and distributed up to the end of 1946; unfortunately, most of the supplies reeeived were not those most urgently needed, although priorities were indieated in Caleutta in May and June, 1945. This situation was not improved by the wrong eonsignment of the first two shipments of drugs and surgieal supplies to Rangoon whieh took several months to on-ship to Singapore.

While the situation in respect of medical stores and equipment improved towards the end of the period of B.M.A., Civil Medical Service had to exist for some time after September, 1945 on the consignment of supplies provided by G.H.Q. (I), small quantities of stores recovered locally from various civil depots and supplies issued from military depots, against demands which were submitted at regular intervals from October, 1945 onwards. Practically nothing was made available from Japanese captured stores by the Army.

Although the European staff shortages improved towards the end of the British Military Administration period, lack of sufficient personnel in this respect severely handicapped the Medical Department. Serious deficiency of local staff and the result of 3½ years terrifying experience while out of contact with modern progress had obvious effects on the rehabilitation scheme.

PART IV

The Advent of the Civil Government

REPORT OF THE MEDICAL DEPARTMENT, SINGAPORE, FOR THE PERIOD 1ST APRIL TO 31ST DECEMBER, 1946

5—Administration and Legislation

Officers of the Malayan Medical Service fill the higher posts (excluding Municipal appointments) in the medical and public health services of Singapore, from which service the staff of the College of Medicine is also drawn. The Malayan Nursing Service is responsible for supplying matrons and nursing sisters for hospital and public health posts. The members of this service have been European, fully trained and recruited through the Overseas Nursing Association, but now this service is open to selected members of the local Nursing Service, who have long and meritorious service and who are deserving of promotion to the rank of sister. In addition, there is a large number of locally trained staff nurses, nurses and probationers, male nurses and laboratory assistants employed in the various hospitals. Sanitary Inspectors, who have attended the Sanitary Inspectors course in Singapore and passed the local examination of the Royal Sanitary Institute, London, are also appointed. All these appointments are for service in Singapore, except when recruited from the United Kingdom when such officers are transferable anywhere in British Malaya. Appendix 1 gives a comparison of authorised and available staff of hospitals and dispensaries.

It is to be recorded with deep regret that more than a hundred members in all grades of the Service lost their lives directly or indirectly at the hands of the Japanese. A complete list of their names is in the process of being compiled.

Legislation enacted during the year has provided for consequences arising from the Japanese Occupation or from the constitution of the Malayan Union. In addition, ordinances to amend the Poisons List to embrace all the Sulphonamide Group and Penicillin, and to allocate additional powers to the Director of Medical Services in the event of outbreak of epidemic, were passed. All legislation enacted during the period under review is to be found detailed in Appendix 2.

Finance: Expenditure for the nine months April to December, 1946 was just over $4,500,000.

Health Division

Administration

Staff: A table showing the present strength of qualified Staff and Establishment strength as provided for in the 1947 Estimates is shown in Appendix 3. According to the latter estimates which are based on pre-war strength the Department is short of one European and nine locally appointed Health Officers.

Legislation: The following were in course of revision or preparation during the period under review:—

(*a*) Rural Board Building By-laws (1947)

(*b*) Food and Drugs Ordinance (1947)
(*c*) The Quarantine (Emergency Cholera) Measures (1947)
(*d*) The Hydrogen Cyanide (Fumigation) Act 194 Regulations 1947.
(*e*) The Quarantine and Prevention of Disease Ordinance 52 of 1939.

(Amendments regarding vaccination against smallpox and inoculation against cholera).

6—Vital Statistics 1946

POPULATION

As the last Census was taken in 1931 and the only enumeration since that date is that compiled by the Japanese in 1944, no reliable population figure for Singapore exists at the moment. This factor is of the utmost importance in assessing the present value of birth and death rates, and indeed of any comparative figures in the field of local vital statistics. Thus any contemporary statistical deduction has to be accepted with caution. General conclusions can be made on material available, however, if due attention is given to trained medical observation.

1931 (census)	557,745
1941 (estimated)	769,216
1944 (Japanese)	860,000
1946 (ration card strength)	948,303

As the average yearly population increase for all races between 1931 and 1941 was only some 3.2%, the 4.7% increase on the 1946 estimate is improbable unless it is accepted that the occupation and post-occupation periods have resulted in a permanent change. Only the new Census can confirm or refute the correctness of the ration card strength. While no sufficiently accurate assessment of present-day population by race is possible, the following table on the 1931–1941 position is an indication of the trend in this direction:—

BIRTHS

TOTAL NUMBER OF BIRTHS RECORDED FOR SINGAPORE

	1940	*1941*	*1942*	*1943*	*1944*	*1945*	*1946*
Europeans ..	288	281	44	1	2	5	85
Eurasians ..	245	267	228	145	141	124	304
Chinese ..	27,742	28,234	22,956	26,406	25,434	19,808	31,209
Malay ..	3,511	3,778	2,977	3,226	3,877	2,633	4,400
Indian ..	1,755	1,654	1,309	1,315	2,051	1,734	2,482
Other ..	254	207	121	173	217	137	174
Total ..	33,795	34,421	27,635	31,266	31,722	24,441	38,654

	1940	*1941*	*1942*	*1943*	*1944*	*1945*	*1946*
Male ..	17,539	17,665	14,439	16,172	16,412	12,794	20,173
Female ..	16,256	16,756	13,195	15,094	15,310	11,647	18,481
Unkown ..	..	..	1	..	..	..	..
Total ..	33,795	34,421	27,635	31,266	31,722	24,441	38,654
Male births per 100 ..	51.9	51.3	52.2	51.7	51.7	52.3	52.2

While no useful object is to be gained by an attempt at a present day birth rate and a comparison with previously recorded figures in the absence of a sufficiently accurate population calculation, there is no doubt that the number of births recorded during 1946 more or less corresponds to the pre-occupation level, and there is an indication that the number is increasing. Can this be taken as an indication of the period of prosperity experienced by certain large sections of the population during the year under review? There was a particular and definite increase in the number of Indian births over the pre-war period. European births were naturally less owing to the fact that not many European wives were in Malaya. The slight increase in males per 100 births is interesting, but this is a fact which can usually be recorded in countries subject to and following on wars.

DEATHS

Total Number of Deaths Recorded in Singapore

	1940	*1941*	*1942*	*1943*	*1944*	*1945*	*1946*
Europeans and Eurasians	211	No	343	213	373	293	153
Chinese ..	12,521	details	22,678	16,300	27,541	21,561	11,357
Malays ..	1,965	avail-	3,631	2,930	9,603	8,662	2,103
Indians ..	895	able	2,993	2,340	5,015	4,625	1,581
Others ..	111		186	147	215	184	74
Unknown ..	2		2	6	4	5	19
Total ..	15,705	15,978	29,833	21,936	43,751	35,330	15,287

	1940	*1941*	*1942*	*1943*	*1944*	*1945*	*1946*
Male ..	9,487	9,730	18,694	13,718	29,515	24,304	9,357
Female ..	6,216	6,245	11,137	8,212	13,232	11,021	5,926
Unknown ..	2	3	2	6	4	5	4
Total ..	15,705	15,978	29,833	21,936	42,751	35,330	15,287

The number of deaths recorded since the liberation shows remarkable decline as compared with the Occupation period, and now appears to be below the pre-war level. Again nothing is to be gained by attempting death rates in the absence of reasonably accurate population statistics. There is no doubt however that the death rate has declined as compared with the 1940/41 period. As it can be accepted without argument that many of the less robust died during the Occupation period the value of this decreased figure as a guide to present conditions is open to question.

Turning to details of deaths by causes, diseases such as beri-beri and malaria, respiratory conditions, infantile convulsions and bowel affections show a remarkable decline since the liberation, although deaths from malaria are still well over the pre-war figure. Pulmonary Tuberculosis has attracted a lot of attention of late. While the remarkable drop in recorded deaths since the liberation is apparent, it would also appear that the position in regard to this disease is again more or less the pre-war.

Although such conclusions as these can be taken as a fairly reasonable assumption, it must be noted that statistics in connection with death certification are now, and always have been, open to a cautious approach. In the

rural districts death certification is still conducted in a most primitive manner and some fifth of the population lives outside the city limits. Even in the Municipal Area where certification is made by medical men a proportion of the cases are not seen until after death. Some 2,856 of rural deaths and 1,137 of urban deaths were reported as from unspecified fever, senility and infantile convulsions in 1946 as compared with 64% and 26% respectively over the occupation period. Certification under these heads can hardly be said to be accurate.

INFANTILE MORTALITY REPORTED IN SINGAPORE

	1940	*1941*	*1942*	*1943*	*1944*	*1945*	*1946*
European and Eurasian ..	28	No	No	40	No	29	21
Chinese ..	3,831	Infor-	details	4,837	details	3,952	2,560
Malay ..	737	mation		771		763	617
Indian ..	194			353		504	244
Others and Unknown	29			51		25	25
Total ..	4,819	..	7,340	6,052	9,039	5,273	3,467

	1940	*1941*	*1942*	*1943*	*1944*	*1945*	*1946*
Male ..	2,597	No	No	3,134	No	2,685	1,874
Female ..	2,221	Infor-	details	2,918	details	2,588	1,593
		mation					
Unknown ..	1			..		..	..
Total ..	4,819	..	7,340	6,052	9,039	5,273	3,467

Infantile mortality seems to have reached a lower than pre-war level, the rate per 1,000 births being about 90 now as compared with 142 in 1940. What is the significance of this decline? It is felt by expert medical opinion that present general health conditions in the Colony cannot be claimed as the deciding factor. During the Japanese regime mortality went up to a remarkably high level in all directions and there is no doubt that many of the less robust perished during that period. This fact may be of importance in the existing low infantile mortality rate. A great deal of increased attention was given to free milk feeding, and increased feeding in general, in Welfare Centres during the period of the B.M.A. and since. The majority of infant deaths are recorded from amongst the Chinese section of the population when rice consumption, particularly of the polished variety, has decreased considerably over the period under review. It is thought by some experienced observers that this and the lack of other unsuitable foods in the market may be the outstanding factor in the reduced infantile mortality figure.

There is a general impression from informed medical sources that an important section of the really poor is more under-nourished and in poorer general health than before the war. Adequate statistics to support or to refute this opinion are not available owing to the grave shortage of skilled staff over the period. It is certain that a proportion of children are seriously underweight, however, and of very poor physique, and that those kept under observation are not increasing their weight in a normal manner.

TOTAL NUMBER OF DEATHS REPORTED IN SINGAPORE, BY CAUSES—1939—1946

Causes	1939	1940	1941	Average 1939/41	1942	1943	1944	1945	1946	Index
Malaria and Unspecified Fever	1,045	1,248	1,155	1,159	3,018	2,402	5,555	6,055	1,929	168
Violence (all forms)	473	454	504	477	575	611	682	801	737	162
Beri-beri	720	607	636	654	2,817	2,009	6,749	6,683	786	120
Senility	793	925	1,062	927	2,174	1,220	2,250	2,285	1,101	119
Bronchitis, Pneumonia and T.B. of Respiratory System	3,299	3,545	3,696	3,513	5,641	5,107	8,635	5,752	3,868	110
Heart Diseases	411	527	536	491	963	560	1,111	940	516	105
Diseases of Circulatory System	136	167	201	168	133	149	197	137	145	86
Diseases of Digestive System	417	425	385	409	447	404	727	539	370	90
Diseases of Pregancy and early childhood ..	1,064	947	972	994	994	1,091	1,188	986	982	99
Infantile Convulsions	1,758	1,850	1,769	1,793	4,280	3,166	4,572	3,118	1,571	88
Diseases of Respiratory System	328	490	431	416	458	417	528	447	367	88
T.B. other than Respiratory System ..	146	220	193	186	81	88	109	72	163	88
Diseases of Genito-Urinary System ..	532	613	499	548	851	581	787	688	394	72
Diseases of Nervous System	358	492	464	438	511	380	425	498	310	71
Influenza-Acute Rheumatism	240	292	305	279	643	323	621	575	195	70
Typhoid, Dysentery, Diarrhoea and Enteritis	1,031	1,339	1,681	1,350	4,279	1,837	4,578	2,811	908	67
Cancer	330	367	362	353	232	258	225	176	217	61
Others	1,117	1,197	1,127	1,147	1,786	1,333	3,812	2,767	691	60
Total ..	14,198	15,705	15,978	15,293	29,833	21,936	42,751	35,330	15,286	100

(*a*) Indicies are based on the 1939/1941 average.

Note:—Pulmonary Tuberculosis	1,643	1,708	1,791	1,714	2,172	2,282	3,324	2,764	1,976	115

Children in hospital wards appear to show a lowered resistance to illness. Serious disease is more frequently met in the school groups than heretofore.

Labour and Migration

(April—December 1946)

Lack of the necessary organisation made it impossible to collect adequate statistics in regard to migration and labour movement over the period. It would appear however that some 35,000 people left the Colony during the latter part of 1946, 10,000 being Indians, 1,000 Ceylonese, the rest Chinese. Temporary Dutch residents are not included. Only the following entries by sea have been recorded since the advent of the Civil Government in April 1946

	Male	*Female*
From China and Hong Kong	3,852	1,628
From other Countries	5,626	2,148

All the former, and the majority of the latter, were Chinese. The proportion of labour in this total was small. 20 to 25% of the entries from "other countries" made a temporary visit.

Some thousands of repatriates entered the Colony during the latter part of the year but these were in addition to the above figures.

7—Hygiene and Sanitation

(1) Malaria

There are no records to show the incidence or mortality of this disease in Rural Areas. No outbreaks of malaria were reported during the period under review, but there was a certain amount of *residual malaria*, no doubt contracted during the last year of the Japanese Occupation. Owing to shortage of qualified staff it has not been possible to carry out routine parasite and spleen surveys, but mosquito surveys have been carried out wherever considered necessary.

(2) Dangerous Infectious Diseases

Smallpox

The first case of smallpox in the Rural Areas occurred on the 10th August, 1946. Up to the end of the year there were altogether 18 Rural cases and three deaths. No doubt the prompt action taken to isolate cases and contacts and to vaccinate the population prevented this disease from assuming larger proportions. A total of 92,000 vaccinations was carried out by the town and travelling dispensaries, Child Welfare Centres, School Medical Staff and Sanitary Inspectors from the 1st April onwards.

Middleton Hospital

In his report for the Middleton Infectious Diseases Hospital for the same period, the Medical Superintendent records a total of 98 cases of smallpox for the Colony from June onwards of which 18 died, five cases being brought in after death. The cases have not been confined to any particular locality and were spread evenly throughout the seven months of the year. Penicillin treatment has been given with encouraging results. The routine is: Adult—starting dose—100,000 units followed by 50,000 units three hourly until scabs are drying off. Children—$\frac{1}{2}$ dose or according to age.

Cholera

The Medical Superintendent of Middleton Hospital also records *one case of Cholera* which occurred before the resumption of Civil Administration in April, 1946. The patient was a displaced person who returned from Bangkok, and was discharged cured in April 1946.

Other Infectious Diseases

(For the Rural Areas *see* Appendix 4).

In Middleton Hospital there were admitted:—

(*a*) 126 cases of Diphtheria and 19 deaths giving a crude death rate of 15%.

(*b*) 6 cases of Cerebro-spinal Fever and one death. All six cases were imported on an U.N.N.R.A. ship from Canton.

(*c*) 36 cases of Enteric Fever for the nine months of whom six died, the main cause of death being haemorrhage.

GENERAL MEASURES OF SANITATION

(1) Anti-malarial measures

From August onwards, rehabilitation work commenced, and up to the end of the year some 3,000 yards of subsoil pipes had been relaid and repaired; over 50 miles of earth drains had been constructed or repaired; 521 pools had been drained or filled in; 32 wells had been shaded; and 30,000 gallons of anti-malarial oil had been sprayed on the breeding grounds of malaria-carrying anopheline mosquitoes. Much work remains to be done, however, as there is constant collapse of our main anti-malarial drainage system due to neglect of maintenance and repairs during the war years. A large programme of work has been mapped out for 1947, which will involve the expenditure of some hundreds of thousands of dollars. Lack of transport and materials is the cause of much delay and difficulty in carrying out these measures.

(2) Sewage Disposal

This work is carried out by contractors as we have not the necessary transport and labour to do it ourselves. In general, this servicing is not satisfactory as in spite of supervision a certain amount of the nightsoil, which is supposed to go to trenching grounds, finds its way to vegetable gardens. A proportion of the nightsoil is used in composting by the Indore method carried out under our supervision. Appendix 5 shows the work carried out from 1st April onwards.

(3) Rubbish Disposal

Refuse is disposed of either by controlled tipping or composting, and a small amount by incineration in remote areas. The continued lack of co-operation by the individual householder makes this work somewhat difficult in the villages. Appendix 5 also shows the amount of work carried out in this respect for the period under review.

(4) Water Supplies

Piped water in Rural Areas is under the control of the Municipal Health Department. Subsoil wells have been provided in the various districts by the Government Health Department. Many unprotected wells were constructed during the occupation, and it will take time to eliminate them.

(5) Offensive Trades
(6) House Inspection } Appendix 6.
(7) Estate Visiting

(8) School Hygiene

The School Medical Service for all schools, both Municipal and Rural, is under the control of the Government Health Department. Owing to shortage of staff and transport difficulties, it was only possible to carry out a limited number of examinations. Rapid surveys reveal that the general condition of school-children is bad, about 40% showing a poor state of nutrition. Pre-war, this figure was about 5%. Two diseases which, pre-war, were rarely encountered in school-children are now significantly present, *i.e.* tuberculosis and rickets.

Pulmonary tuberculosis has now made its appearance among the 6-14 age-group. Pre-war, it was occasionally found in adolescents of 16 years and upwards. Now, some 1% of school-children seen appear to suffer from this disease. Similarly with Rickets, where 3.3% of those examined showed the usual deformities.

With regard to treatment, it was not possible to carry out re-examinations and so assess improvement. The only Health Officer we had for this work had to be taken away for other more pressing duties. *See* Appendix 7.

(9) Nutrition of School-Children

The Lady Health Officer, Schools, reports as follows:—

Urgent steps were taken to help combat the lamentable amount of malnutrition. The school feeding scheme, which was commenced under the B.M.A., through the Singapore Executive Welfare Committee, was extended to as many of the most seriously affected schools as possible.

By the beginning of April three feeding schemes had been started under the general direction of a child feeding committee under the Director of Medical Services. These were extended until, by the end of the school year, 9,900 school-children had received 1,191,518 free meals. 33 schools were catered for and included all Malay Schools in Singapore, and outlying and town schools where nutritional deficiency was judged to be most severe.

The first scheme was under the control of the Education Department. In this scheme the meals were prepared by a contractor under the supervision of the Government nutrition expert and consisted of rice, meat or fish, green and root vegetables and a curry gravy. The cost to Government was 20 cents per meal. Four thousand and two children partook of 555,750 meals.

The second scheme was under the control of the School Health Department and consisted of a soup meal. The soup was reconstituted from a nutritious soup mix powder which was a gift from the South Africa International Red Cross. Prawns, meat, chillies and soup vegetables were frequently added by the schools concerned. At first biscuits, and later fresh fruit such as papaya, pineapple or banana, were served with this meal. The cost was approximately 8 cents. Four thousand two hundred and ninety-two children received 389,574 of these meals.

The third scheme was sponsored by the nutrition unit of the College of Medicine. Varied diets and cooking instructions were drafted out and given with the necessary funds to the school principals who undertook to supervise the buying, cooking and serving of the food. Meat, fish, dhall, etc., vegetables and rice were served with curry or were made up in chupattis—envelopes of thin pastry. Fresh fruit also accompanied this meal and the cost was 12 cents. One thousand six hundred and six children received 246,194 of these meals.

In addition to these free meals some children took advantage of the proximity of their schools to People's Kitchens run by the Social Welfare Department. Three thousand five hundred and ninety-five children bought 100,000 meals in them during their recess periods. They paid 25 cents for each meal.

Total number of meals

Thus 9,900 children had 1,191,518 free meals in the school feeding schemes and 3,595 children had approximately 100,000 meals, for which they paid through the Social Welfare Department's People's Kitchens.

Marked success attended all these feeding schemes and the meals were enjoyed and appreciated by the children. It is regrettable that they have now ceased through lack of funds before they have achieved their purpose. A concentration is now being made on child feeding in the 2–6 age group, a very vulnerable group not otherwise catered for in the urban area. Longstanding malnutrition is still widespread, and school feeding on a large scale is necessary to help build up resistance against diseases consequent on insufficient and wrong feeding, and on the appalling over-crowding and unhygienic conditions which form the background of so many of Singapore's school-children to-day.

(10) School Dental Service

It is regrettable that no Dental Service is available for Singapore's school-children, as this service is very badly needed and the position is likely to get much worse unless it is tackled immediately and on a large scale. In the course of routine School Medical Inspections, a high percentage of the children examined showed dental defects.

A detailed scheme has been put up by the Professor of Dental Surgery in conjunction with the Government Health Department to cover the next 10–15 years.

(11) Labour Conditions

(a) Estates

It was not possible to undertake inspection of Estates owing to shortage of staff and transport difficulties.

(b) Government Departments

Only 25% of the labour force employed by the Government Health Department is housed, the remainder having to find their own accommodation in their respective working districts. In the five year plan 1948–52, provision has been entered for the necessary additional accommodation in all districts, and it is hoped by the end of this period that all labourers will be housed as they should be.

(12) Housing and Town Planning

The situation with regard to buildings in the Rural Areas is most unsatisfactory owing to many insanitary dwellings which sprang up during the war years, and this practice continues in spite of the efforts of the Rural Board. A properly organised Building Department is required to deal with this matter. The Rural Board Building Bye-laws have been brought up-to-date, and it is now proposed to exercise the necessary control so badly needed.

(13) Food in Relation to Health and Disease

Regulations under the Sale of Food and Drugs Ordinance (Chapter 191) have been revised, and will come into force in January, 1947, as the Food and Drugs Regulations, 1947.

(14) Measures Taken to Spread Knowledge of Hygiene and Sanitation

These measures are now undertaken by the Public Relations Office as and when advised by the Government Health Department. Such measures as were undertaken in 1946 were mainly concerned with vaccination against smallpox.

(15) Port Health Administration: *See* Appendix 8

(*a*) *Singapore*

The Naval Health Officer continued to carry out the inspection of ships at the Quarantine Anchorage until the end of June, 1946. From July until the end of the year, 732 ships (with a total net tonnage of 2,541,694) from infected ports were examined, and 3,196 passengers without valid vaccination certificates were quarantined on St. John's Island. The average annual number of ships inspected pre-war was approximately 950, so that there has been quite a considerable increase in this aspect of Port Health work. In addition 4,212 junks and small craft were also inspected for evidence of major infectious disease. As Singapore has been an infected port for smallpox since August, 1946, this Department has concentrated on the issue of valid vaccination certificates in accordance with the International Sanitary Convention 1944. A new centre at North Canal Road Dispensary was opened for this purpose, with a full time Health Officer in charge, and by the end of the year 18,579 vaccinations and 18,246 inoculations against cholera (for passengers travelling to cholera-infected ports) had been carried out. Three more Health Officers are urgently required for the efficient control of all Port Health Quarantine work.

Arrangements have now been made with local experts to commence the fumigation of ships with Hydrogen Cyanide, early in 1947, and the necessary legislation has been prepared.

(*b*) *Airport Health work*

Again owing to shortage of staff it was possible only to carry out Health work at Kallang Airport. By arrangement with the R.A.F. checking of passengers and certificates has been carried out by R.A.F. personnel. This is a very temporary solution, and at least two more Health Officers are required for the control of civilian passengers at both Changi and Seletar Airports. At Kallang Airport the Health Officer, who is on call both day and night, examined 203 aircraft and their passengers and crews.

(*c*) *St. John's Island Quarantine Station: See* Appendix 9

Appendix 9 shows the work which was carried out on St. John's Island for the last 9 months of the year. There was one imported case of smallpox from Canton.

A breakdown in the water supply pipe system occurred at the end of the year and it may be necessary to replace the pipes, many of which are very old and badly rusted, with new pipes. The sewage system, which was also neglected during the occupation years, has also had to receive attention and may require major repairs in 1947.

On the whole the Camps 1 to 16 are in a reasonable state of repair with the exception of Camp No. 5, which will have to be replaced by a more modern and permanent building.

Another difficulty experienced during the year was in respect of suitable craft for boarding and landing work. Pre-war, the Master Attendant supplied launches for this purpose as and when required and the Health Department

possessed two passenger flats for landing passengers at St. John's Island, and also a fumigation launch for deratisation of ships. Now there are but two R.A.S.C. launches, which are not satisfactory, but provision for a full complement of up-to-date craft will be asked for 1948.

(16) Maternity and Child Welfare: *See* Appendix 10

Prior to April, 1946, the pre-war centres were used both as treatment and welfare centres as there was widespread sickness in the Rural Areas, mainly due to malnutrition and absence of proper treatment during the war years.

On the return of the Public Health Matron in May 1946, a gradual changeover took place, and the centres had resumed their normal duties later in the year. The staff consists of a matron, two sisters, 10 nurses, 14 midwives, and 14 attendants; and with the exception of one nurse, one midwife and one attendant, all the pre-war staff had returned to the districts where they had been stationed before the occupation.

There are nine Welfare Centres each with a resident nurse, midwife and attendant and three sub-centres with a resident midwife and attendant only. In addition weekly clinics are held in nine other districts including seven islands, and these include a police compound, the corner of a crowded shop, P.W.D. Coolie Lines, or any place where there is shade and a table and chair for the staff. There is a constant and enthusiastic demand throughout the Rural Areas for this work, and the local population, which is mainly Chinese (except for the population on the islands), has offered to collect funds to build three up-to-date Centres in three of the Districts. In the Bukit Panjang District plans for a modern welfare centre have been passed and building is about to commence.

The following figures for attendances and work carried out by the Public Health Matron and her staff speak for themselves: total attendances for infants under one year—39,096; total attendances of children over one year—45,309; ante-natal attendances—8,983; post-natal mothers (with infants under 6 weeks)—4,684; maternity cases—3,317 confinements attended to, followed by 20,339 nursing visits; 68 cases of difficult labour taken to the Kandang Kerbau Maternity Hospital; home visiting to infants up to 40 days old—28,563.

Free milk is provided in powder form to all expectant and nursing mothers, motherless infants and children of 1—4 years. The number of feeds given was 216,955.

There can be no doubt that the rural people value this work, and in many instances mothers and children travel for long distances to attend the nearest centre. Every encouragement must be given to meet the demand which is increasing almost daily.

(17) Travelling and Outdoor Dispensaries: *See* Appendix 11

Figures for the period under review are shown in Appendix 11.

There are two Outdoor Dispensaries, at Bukit Timah and Paya Lebar.

Only one pre-war Travelling Dispensary was available for Rural Areas.

Provision has been entered, however, and approved in the 1947 Estimates for two new Travelling Dispensaries, and the Rotary Club approached Government towards the end of the year with a view to presenting a new and up-to-date vehicle for use in the Rural Areas.

(18) Public Health Conferences

The Honourable, the Colonial Secretary, on August 26th 1946, inaugurated the first Public Health Conference between Civil Government and Municipal, and Military Public Health Authorities.

Subsequently further conferences were held on October 14th, 1946 and November 25th, 1946. The meetings were attended by the principal civil and military officers engaged in Public Health work. It is proposed to hold these meetings every two months as they have proved invaluable as a medium for the interchange of ideas and the standardization of public health procedures in Singapore. At the conference held on November 25th, 1946, Professor Rodney R. Beard of the Pan American Airways and Comm. Wardmaster W. E. Blight, H. M. Special Commissioner, S. E. A. Health Intelligence Representative, were present as visitors. The Director of Medical Services is the permanent Chairman of the Conference.

8—Hospitals Division

At the beginning of April 1946 the medical and surgical needs of the civil population of the island of Singapore were being catered for by the pre-war Government hospitals, with the exception of the large General Hospital which was still under control of the Army, and the Mental Hospital which was in use by the R.A.F. and Japanese surrendered personnel. With Victoria School as an infirmary, a convent school on the sea-shore as a tuberculosis centre and two mission hospitals, the total bed strength available was just over two thousand for all purposes. Of the other Government hospitals, Tan Tock Seng Hospital was dealing with all male patients and first and second class female patients. Kandang Kerbau Hospital was treating all maternity cases and third class female patients. Both these hospitals had out-patient departments. The Middleton Hospital for Infectious Diseases (in normal times a Municipal hospital), the Leper Hospital, the Social Hygiene Hospital, the St. Andrew's Mission Hospital, the Orthopædic Hospital, the Prison Hospital and the Police Hospital were all carrying out their proper function.

All the Government hospitals fortunately had survived the war and Japanese occupation years without significant damage to buildings but all had suffered much loss of furniture, equipment and fittings of all kinds, the loss being most marked in the General Hospital. Though these deficiencies were in some measure gradually made good, they delayed and restricted the work of the hospitals.

The work of rehabilitation was particularly affected and seriously impeded by a marked shortage of medical officers, nurses and dressers, which was partly the result of the barren years of the Japanese Occupation. Thus there was absolute necessity for concentration of institutions and the closure of the temporary additions opened up during the period of the British Military Administration. The accommodation available at the end of 1946 was some 2,400 beds with barely 1,000 available for acute general disease in a city with a population approaching the million mark. The staff shortage continued until the end of the year and promises to do so for some considerable time to come.

The rehabilitation of the General Hospital was the most formidable task facing the Medical Department but the available staff tackled all the innumerable difficulties and problems which have arisen with remarkable energy and loyalty. They could all remember the General Hospital of pre-war days and they remembered the many members of the Singapore hospitals' staffs, doctors, sisters, nurses, dressers and hospital servants (and students) who had lost their lives during the days of war and the Japanese Occupation. The three main blocks of the General Hospital, formerly known as the Upper, Middle and Lower Blocks, were renamed the Bowyer, Stanley and Norris Blocks respectively, in memory of three officers who had been closely associated with the hospitals of Singapore before the war, and who had lost their lives during that time.

The period under review has been one of remarkably arduous work amidst innumerable well-known difficulties of post-war Singapore. A total strike of all hospital servants, for five weeks during August/September—the second in twelve months—involving all hospitals except the Mental, delayed progress and added a severe burden to the already over-worked staff. The invaluable help of the various army units, civilian volunteers, prisoners from the civil gaol and Japanese surrendered personnel enabled the hospitals to continue to function over this period.

The serious shortage of staff, in particular, made it inevitable that admissions to hospitals should be restricted to acutely ill patients whose stay in hospital was limited to the minimum period necessary. This naturally threw a tremendous burden on the out-patients department, well exemplified in the following returns, and detailed in Appendix 12.

All Hospitals	*Out-patients*	*Total Attendances*
1938	37,989	87,447
1946 (April/December)	71,230	164,688

The figures from the Radiology Department of the General Hospital are also revealing. During the latter half of 1946 the number of patients X-rayed there was 6,628 as compared with some 6,000 in 1938 for both the General and Tan Tock Seng Hospitals.

The total number of admissions to all hospitals, excluding the Quarantine Hospital and Leper Settlement, was 21,174 compared with 35,400 in 1938. The average daily number of patients in hospital was 1,689 and the percentage of death to total admissions was 6.14 (*See* Appendix 13).

In dealing with the figures in the Annual Report, it has to be remembered that adequate staff could not be engaged and, because of this, the big hospitals such as the General Hospital and Tan Tock Seng Hospital could only accommodate half their normal capacity. The average daily number of patients in the General Hospital in December 1946 was 442, as compared with 772 in 1939. So it is apparent that the restricted staffs of the hospitals have covered a remarkable amount of work, man for man, over the period.

The great increase in road accidents and the marked increase in crime and lawlessness have provided a formidable number of casualties for treatment at the General Hospital.

The result of the three and a half years of Japanese occupation with its privations and poor, restricted diet is thought to have had a profound effect on the health of the people in general, resulting in lowered resistance to infections and much general ill-health. It is not surprising that the incidence of pulmonary tuberculosis is said to have reached an unusually high level. Certainly, tuberculous meningitis in children is unusually common.

The period of the Japanese occupation has upset the continuity of contact with the health of the civilian population and so it is not possible over such a short time to give adequate accurate estimations of the increased or decreased incidence of disease. The apparent great incidence of pulmonary tuberculosis has been noted and it has been impossible to accept into hospital the large numbers seeking admission. Only moribund cases and early cases have been accepted into hospital. The early cases have been given a special diet and, where possible, artificial pneumothorax has been performed. During the period under review artificial pneumothorax has been performed on 1,911 cases. The returns of diseases indicate that there has not been a marked increase in the incidence of any special disease. Compared with 1938 returns

there would appear to be, in fact, a marked reduction in the incidence of dysentery, beri-beri and anaemia. The figure for beri-beri is striking. In 1938 the cases of beri-beri admitted to hospital numbered 2,264, while during the period of this report only 80 cases were admitted. This is attributed to the type of unpolished rice now issued, compared with the highly polished rice of pre-war days. It must be remembered, however, that admission to hospital was restricted to cases of acute illness, and a great number of cases of anæmia, enteritis and œdema, for example, were treated in the out-door dispensaries and the records of these cases are not available.

A return of Diseases and Deaths for all hospitals will be found in Appendix 14.

Gynæcology and Midwifery: Since July, 1946, the Kandang Kerbau Hospital has been the only obstetrical and gynæcological hospital serving all classes of the Singapore community. With the closing down of St. Andrew's Mission Hospital, the non-opening of the Sepoy Lines Maternity Hospital and the incorporation of the Gynæcological Service, the work at Kandang Kerbau Hospital has increased very considerably, working to a capacity of 287 beds. The average number of admissions per day has been 21 and the average number of patients seen in the Out-patients Department has been 211.8.

Gynæcological admissions numbered 1,216, while visits at the Out-patient Department totalled 5,490 (about three times the figure for the corresponding period in 1941) and 828 operations were performed (about twice the 1941 figures). Total gynæcological deaths numbered 37. A classification of gynæcological admissions and of gynæcological deaths will be found in Appendices 15 and 16.

Obstetric admissions numbered 4,429 and 4,349 deliveries were recorded Of these deliveries, 82.84% were to Chinese mothers. Of the total cases delivered, 28.74% were primiparae, 84.8% were normal, 15.2% were abnormal. Of the abnormal cases, 7.53% required operative interference.

Though attendances at the Antenatal and Post-natal Clinics were almost double the figure for a corresponding period in 1941, the difficulty in getting patients to attend is great. A large proportion of the attendances at the Antenatal Department was those who had been sent from the Government and Municipal Maternity and Child Welfare Clinics, owing to some complication. Much can be done to educate the poor and less literate people of Singapore regarding the value of antenatal care. In particular, stress should be laid on the very much higher mortality and still-birth rates of this hospital's "unbooked" cases. Seen below is a comparison of "booked" and "unbooked" cases, showing the still-birth, morbidity and mortality rates:—

	"Booked" Cases (two or more visits)	*"Unbooked" Cases*
Normal	88.0%	85.3%
Abnormal	12.0%	14.7%
Still-birth	2.7%	6.2%
Morbidity .. .. (Rotunda standard)	8.0%	8.7%
Mortality	0.23%	1.58%

The maternal morbidity rate is higher than that of European and American maternity hospitals. To a great extent, this is accounted for by the poor state of health of the patients admitted and to their non-attendance antenatally. Under-nourishment is due more to the fact that the poorer classes do not know what type of food they must buy and eat than to the fact of low salaries or poverty. As is seen above, the morbidity rate is higher in the "unbooked" cases.

The main diseases complicating pregnancy are listed in Appendix 17. Albuminuria complicated 50% of all cases and this high figure is attributed to the low protein diet of the poorer classes. Beri-beri accounted for only .36% of pregnancy complications. A classification of abnormal deliveries will be found in Appendix 18. From an inspection of all deaths recorded it will be found that deaths from preventible causes occurred in the "unbooked" cases. In "booked" cases, the mortality rate was 0.23% compared with 1.58% in the "unbooked" cases. There were 46 maternal deaths, 1.05% of total deliveries. This figure compares favourably with the year 1939, when the percentage of deaths to deliveries was 1.09.

A classification of obstetric deaths will be found in Appendix 19.

Training and work of Midwives: Regular courses for the training of nurses and midwives are provided at Kandang Kerbau Hospital, which is also a teaching school for medical students. Teaching commenced in June, 1946, and seventy-five midwives who had qualified during the Japanese occupation were given a refresher course, each midwife doing three months of resident duty.

The training of midwives is divided into two classes, *A* and *B*. Class *A* includes all those with sufficient education to obtain a diploma. Class *B* includes those of a lower standard of education but who have undergone practical training, which includes six weeks under the Public Health Matron at the Rural Child Welfare Centre, followed by an oral and practical examination. During the period following the period of British Military Administration, 28 nurses passed from Class *A* and 47 midwives from Class *B*.

Ophthalmology: The Ophthalmic Department has been regrouped under the unit system and during the period under review new patients in all numbered 3,512.

A noteworthy feature has been the almost total absence of keratomalacia, a destructive disease of children which was due to the use of sweetened condensed milk deficient in Vitamin A. Before the war, when condensed milk was much cheaper, it was usual to admit two or three cases of keratomalacia per week. When normal conditions return, it is hoped that it will be possible to ensure that no condensed milk deficient in this way is used as a complete substitute for ordinary milk.

Comparative figures are not available, but the impression gained is that trachoma has not noticeably increased during the war years. This may be attributed to the cessation of immigration from North India and South China, the two great reservoirs of the disease. As normal conditions return, however, an increase is inevitable. As soon as practicable, some measure of control must be introduced and it is hoped it will be possible to make the disease a notifiable one.

There has been a marked increase in major eye surgery. Total operations in the General Hospital number 535 for the half year to December, 1946.

Dental Surgery: The Dental Department, in common with others, has functioned with a greatly reduced staff, partly drawn from King Edward VII College of Medicine and partly from the General Hospital.

There has been a considerable increase in the number of cases of major disease and injury. Traffic accidents and to a lesser degree industrial accidents and gang fights have contributed to an increase in jaw injuries. It is estimated that the time spent on this type of case represents the half time of one officer. There is also a marked increase in the number of cases of serious injury resulting from unskilled interference; the use of modern drugs has prevented a high mortality in this type of injury.

Dental and oral disease affects not less than 90% of the school-going population.

A summary of the work done in the Dental Department during the period under review will be found in Appendix 20 and a classification of nationalities treated in Appendix 21.

Social Hygiene: A reference to the section on the British Military Administration period will indicate the approach made to the control of venereal disease during a time of improvisation. The success of the scheme then introduced favoured a continuation on similar lines after the advent of the Civil Government; hence the Social Hygiene or Middle Road Hospital as a separate unit with general out-patient sections, and a separate clinic in the dock area.

The total number of beds available in the Middle Road Hospital is 74, of which 50 are for female and 24 for male in-patients. In the course of the nine months under review 1,108 female and 361 male patients have been treated. During the same period there has been a total of 4,932 female out-patient attendances, of which 1,267 have been new patients. On the male side there has been a total of 21,694 out-patient attendances, of which 4,932 have been new patients.

Unfortunately there is a shortage of staff, which has reduced to some extent facilities for treatment. Since July 1946, the medical staff has consisted of two full and one part time medical officers, a nursing sister, ten nurses and fourteen dressers for both Middle Road Hospital and Tanjong Pagar Clinic. The outdoor staff has consisted of seven Supervisors, young women drawn from every walk of life, who were employed for the purpose of contacting prostitutes and other potentially infected women and persuading them to attend the Clinic for examination and treatment. Their work has been of great value; among cases brought by them have been 235 who were reported as having infected Service personnel with venereal disease. These reports are made by the Anti-vice Section of the Military Police, with whom a close liaison is maintained. (Such cases are termed "Military" cases). No form of compulsion is used, the women being persuaded to come for examination and subsequently advised as to any treatment required. When treatment is refused, the possible late effects and complication of disease are explained to the patient. Over the nine months under review 20% of all military cases refused treatment, but the trend has been towards a steady reduction in the number of refusals.

In-patients: The figures for in-patients show 361 males as compared to 1,108 females for the same period. These figures reflect the greater reluctance on the part of the male to submit to in-patient treatment—largely for economic reasons—and the limitation in number of available beds.

Penicillin which was in somewhat short supply at the beginning of the period under review is now readily available and has been used, where possible, as the drug of choice, because of the shortness of treatment and speed in rendering the patient non-infectious. It has been used on 442 male cases and 1,257 female cases.

A table showing the total number of new cases of the varying classification of venereal disease will be found in Appendix 22. The various drugs used and the number of cases treated with each are to be found in Appendix 22 (*A*).

The treatment schedules employed have been:—

For Acute Gonorrhoea: Penicillin 50,000 units, 3 hourly for five injections (total 250,000). In the case of in-patients this has been combined with Sulphathiazole by mouth: 2 Gm stat. and 1 Gm, 3 hourly to a total of 25 Gm.

It is too early to make any definite statement but, in the latter part of the period under review, an increasing number of patients failed to respond satisfactorily to the above dosage. In these cases the Penicillin course was repeated and increased to a total of 500,000 units. In a small number of patients who appeared to suffer relapse after this increased dosage, there was every reason to suspect the possibility of reinfection. Perusal of current literature suggests that so far no true Penicillin-resistant strain of Gonococci has been found, those apparently so, in *vivo*, being shown to be sensitive in *vitro*, and failure usually being traceable, eventually, to some factor such as loss of potency of drug or faulty technique in storage, preparation or administration of Penicillin.

For Syphilis: In syphilis also Penicillin has been used as the drug of choice for the initial treatment of all stages—early, late and congenital. The dosage for infants has varied from 2,500 units x 3 hourly x 60 injections up to 7,500 x 3 hourly x 60 injections, being calculated by body weight. The clinical improvement in these congenital syphilitic children has been extremely rapid and most satisfactory. Where parental co-operation has resulted in adequate follow-up, a subsequent course of ten intramuscular injections of Acetylarsan at weekly intervals has been begun one month after the course of Penicillin. So far no relapse has been seen following the double course, but clinical relapse has occurred following Penicillin alone.

Adults are given an initial course of 50,000 units of Penicillin 3 hourly for 60 doses, giving a total of 3 megaunits. This of course can be applied only to in-patients, out-patients being treated with routine course of Arsenicals and Bismuth. Again where adequate follow-up has been possible, Penicillin therapy has been followed after the lapse of one month by a course of some Arsenical (depending on the stage of the disease) and Bismuth, a routine ten week-course being given.

Only a general impression of results over the short period of nine months can be given, but they are:—

(1) that congenital syphilis shows well marked and rapid improvement;
(2) that the results, as judged by clinical and serological findings in primary and early secondary syphilis, are satisfactory;
(3) that in late syphilis there is definite early clinical improvement as a rule, but that serological improvement is either non-existent or extremely slow.

Mental Hospital: This hospital was re-opened on 15th April, 1946 but only three wards were then available for civil patients. At 31st December, 1946, a total of eleven wards were made available and up to this date 693 patients had been admitted, of whom 217 were discharged, 90 died and 4 absconded. The average daily number of patients was 254.

Leper Settlement: The Leper Settlement is divided into a male and a female section. On 1st April, 1946 there were 306 inmates, including 32 children, and during the period under review 110 patients were admitted, there being 337 cases remaining at the end of the year. Of these, 150 were males and 187 females.

Patient-workers assist in the smooth working of the settlement. From these is elected a Patient-supervisor for each section. All these workers are given a small monetary allowance.

Routine treatment consists of weekly intramuscular and daily inunction of Oleum Hydnocarpus. Those who react badly are given intravenous injection of Calcium Gluconate.

The diet is the same as that of other hospitals, excepting that the daily issue of rice is increased from six to eight ounces. Recently, fresh milk and fruit have been included in the daily diet of school children.

Patients are encouraged to grow fruit and vegetables and to rear poultry and pigs on the Crown land surrounding the settlement. Their produce is bought by Government at controlled price and consumed by the lepers themselves.

Prison Hospital: There is only one prison in use at the present time. The general sanitary condition is good and the health of both the staff and the prisoners has been satisfactory. The few cases of infectious disease reported in the Appendix were entirely confined to new arrivals; this also applies to all cases of malaria. There was no noticeable lessening in the number of cases of coryza amongst prisoners.

In addition to all members of the staff and their families, 4,495 prisoners were vaccinated.

During the year several nutritional surveys were made. The nutritional state of prisoners had greatly improved within the first six months. Of a large number later examined, the nutritionist reported only one case of beri-beri and no case of riboflavin deficiency, compared with a high incidence of serious deficiency in this and other respects at the original survey.

There were 892 admissions to the Prison Hospital during the period under review. These admissions are classified in Appendix 23. A classification of nationality of prison hospital patients will be found in Appendix 24.

Pathological Section: The first unit to open at the General Hospital was the Pathological Branch. Emergency repairs and cleaning were carried out and equipment serviced and set up entirely by the laboratory staff. This called for hard manual labour and considerable co-operation on their part. It is noteworthy that during the strike in August, 1946, attendants in this department remained loyally at work despite threats and intimidation.

The work carried out by this department will be found summarised in Appendix 25. It includes post-mortem examinations (including a large number of coroner's cases), histological examination of autopsy and biopsy material, routine examinations for hospitals and medical departments and from outside sources, preparation of media, maintenance of sterile apparatus for the hospital, preparation of agglutinable suspensions, maintenance of type cultures, miscellaneous examinations such as penicillin assays and penicillin sensitivity tests, large scale preparation of distilled water for the hospitals and dispensaries, animal inoculation and Friedman's test for pregnancy, etc.

Attached to the medical wards of the hospital itself is a smaller clinical laboratory dealing with routine ward material. Similar clinical laboratories exist in all the main hospitals.

As a temporary expedient the administration, development, maintenance and housing of the *Blood Transfusion Service* became the responsibility of the Pathological Branch. Through the splendid co-operation of Service personnel, this organisation rendered excellent service to the public. The work has expanded steadily in spite of inadequate staff, poor transport facilities and the difficulty in obtaining donors. This difficulty in obtaining donors has proved the major problem, and the future of this essential service depends almost entirely on the public response to such calls. The service is run on a voluntary basis.

The actual work involved has been the institution and maintenance of a panel of donors, the maintenance of records in connection with the taking and

distribution of blood, arranging of bleeding sessions, transport of donors and attention to their comfort, the proper cleaning and sterilising of glassware and rubber, the grouping and matching of blood, the preparation and maintenance of blood giving and taking sets, the preparation of pyrogen-free distilled water, as well as the actual taking and storing of blood. The Service also issues dried blood plasma and maintains a constant supply of sets of distilled water for administering this in the hospital wards.

An analysis of numbers and types of donors will be found in Appendix 26, and an analysis of donors according to nationality will be found in Appendix 27.

SURGICAL PHYSIOTHERAPY DEPARTMENT

During the period under review the Surgical Physiotherapy Department had been functioning in Tan Tock Seng Hospital. It was considered that it could be better supervised and properly developed if this unit were housed in the General Hospital, and towards the end of the year steps were taken to transfer the unit to the General Hospital. The following account of the initial work of this unit in the General Hospital is given to illustrate the beginnings of this new department in the General Hospital.

It has been amply demonstrated by experience gained during the war that the treatment of injuries demands more than is afforded by a brief stay in hospital and the application of a plaster cast. Strengthening of muscles and the movements of joints are essential for the full function of the injured parts. This aspect of the problem of treatment of injured persons is provided in this new department. The Department at the moment has a small staff of two qualified physiotherapists and a physical instructor, who has been selected from the local dresser staff and has received a training in this new, specialised line of work. Exercises conducted individually and in classes designed to ensure general fitness as well as restoration of function in the injured parts are carried out. The patients include out-patients, in-patients who have reached the ambulatory stage, and general ward cases. In addition, forms of therapy, light and electrical, are carried out where necessary. Within the brief space of six weeks the work which has presented itself has reached the capacity of the staff provided.

In addition to this routine work for which the Department is primarily designed the care of patients in the Orthopædic Hospital has been undertaken by the members of the staff, and a start has been made to undertake the care and remedial treatment required by school children who are exhibiting certain deformities of a postural character which, while initially slight and apparently of minimal significance, steadily progress and eventually lead to life-long deformity and crippling. This class is carried out with the co-operation of the school medical officers and represents a piece of preventive medicine of the highest value.

Photographs illustrating this work will be seen elsewhere in the Report.

Hospital Diets: Early in the year a committee was appointed to study diets for Government Institutions. Their recommendations, which were made available to all hospitals, covered the choice of foodstuffs with regard to their nutritional value, methods for contracting for the supply of diets and the supervision of institutional catering. They also drew up diets for all types of hospital patient, servant or person fed at Government institutions.

The very high cost of living at June, 1946 is clearly demonstrated by a comparison of costs to be found in Appendix 28. Although there is a considerable drop in costs between the months of June and December, 1946, the figure is still a high one when compared with pre-war average, as is shown below:—

AVERAGE COST OF HOSPITAL DIET PER HEAD PER DAY AT THE GENERAL HOSPITAL, SINGAPORE

	Year 1938	*June/Dec. 1946*
	$ c.	$ c.
1st. Class	1 34	4 28
2nd Class	0 99	3 76
3rd Class	0 26	0 79

9—King Edward VII College of Medicine

When Singapore was reoccupied by the British Forces the College of Medicine buildings were taken over as a Vaccine Institute, and the staff was not allowed access. The buildings were returned to the College on 1st April, 1946.

The work involved in the rehabilitation was enormous, but the energy and devotion of the staff was such that it was possible to resume teaching on 17th June, 1946, when 200 of the pre-war students returned to the College. In October, 1946, 94 new students were admitted, 6 of whom had already completed part of their course elsewhere.

The standard in the Professional Examinations held in September, 1946 was remarkably high, and it is encouraging to find that students, in spite of their experiences, are serious, mature and enthusiastic. The Final Professional Examinations were held in December, 1946, when 21 were awarded the Licenciate in Medicine and Surgery and 6 the Diploma in Dental Surgery. One student passed the Final Dental Professional Examination in September, 1946 and 2 students were awarded the Diploma in Pharmacy in September, 1946.

At the beginning of the academic year in October, there were 293 students in the College, and at the end of the year there were 264. 202 students were resident in the hostels.

The period under review has been difficult owing to the shortage of staff and equipment. Large orders for equipment have been placed in England but very few items had arrived up to the end of the year. The Library of the College is fortunately intact and during the period many additions were made.

The Government endorsed the policy recommended by the Council of the College, namely that no old student of the College should be prevented from completing his course for financial reasons, and financial assistance by the Government of the Malayan Union and the Government of Singapore was generously given to both old and new students.

Research was restricted, owing to the limitations of staff and equipment. The Department of Biochemistry carried out a number of valuable investigations and surveys on the state of nutrition in Singapore, the results of which are referred to in the following pages.

REPORT ON NUTRITION

(FROM THE NUTRITION UNIT, COLLEGE OF MEDICINE)

"*Research*: With the existing apparatus and chemicals available research has been confined to the elaboration of a satisfactory method for the

estimation of the oxalic acid content of foods. Various workers have produced evidence to show that the availability of calcium in the food is in direct proportion to the quantity of oxalic acid present. A food containing a high amount of oxalic acid will not only affect the availability of the calcium present in that food but will also combine with the calcium of other foods eaten. During the year intensive investigations were carried out to test the validity of existing methods so that ultimately a satisfactory method could be adopted for the estimations of oxalic acid in local foods. This work is in progress now.

Other Investigations :

"(*a*) *Routine*: About 50 foods, both cooked and uncooked, including meals from schools and People's Restaurants were submitted to a general food analysis.

Samples of shark liver oil prepared locally and purchased by the Medical Department are usually sent to the department for a check on the vitamin A content and it was found that the samples were of poor quality, containing about half the quantity of vitamin A that should be present in a good specimen of shark liver oil.

"(*b*) *Family Dietary Investigations*: Dietary and budgetary information has been collected from 131 families with a total number of 673 people in different parts of Singapore. The racial distribution of the families was as follows:—Chinese 83, Malay 33, Indian 15. These surveys were undertaken by the women investigators of the nutrition team and a period of five days for each family was spent on the survey. Each member worked on three families for the same period and at the end of the dietary survey a clinical assessment of the state of nutrition of every available member of the family was made. About 75% of the families were earning incomes of less than $100 per month and of these, 45 families earned less than $50 per month. The investigations were conducted on families with low income levels with the idea that these people are more prone to show the effects of food shortage; so that effective measures could be undertaken immediately if the surveys revealed a marked deterioration in the health of the population. It is not possible to give in this report a detailed account of the results of the investigations, except the main findings. From the data collected of the various foods consumed the results of the dietary surveys were calculated and expressed in terms of the nutritional essentials such as calories, proteins, mineral salts and vitamins per head per day, and a comparison was then made with the standard allowances recommended by the Food and Nutrition Board of the National Research Council of the United States in 1943. Such information permits of international comparisons being made.

"Although a certain amount of criticism has been levelled at the quantities of a few of the food factors as being too high, nevertheless the trend in modern nutrition is to regard the intake of optimal amounts of the specific nutrients as the goal to be achieved in the daily dietary. Appendix 29 shows the average intake of the food factors per head per day for the three racial groups surveyed; and in an adjoining column this average intake is expressed as a percentage of the average intake recommended by the National Research Council.

Summary of Results of the Dietary Surveys

"1. In general it was found that only about 30% of the families were on diets which had a satisfactory calorie value. 25% had diets which furnished less than half of the recommended energy allowance. The latter were existing on rations just above the bare subsistence level, and most cases of malnutrition were found in this group.

"2. Contrary to expectation the list of foodstuffs consumed was long and varied, but the amounts purchased were inadequate in quantity and quality to supply even the restricted allowance of the various food factors.

"3. Particularly prominent were the deficiencies in calcium and riboflavin. The signs of deficiency of the former food factor with the exception of dental caries were rarely found. The deficiency of riboflavin correlated with the findings of several nutrition surveys which revealed a fairly high incidence of tongue lesions (*vide* Nutrition Surveys).

"4. Low according to the standards adopted were the intakes of Vitamin B^1 and protein. There was a greater relative proportion of beri-beri cases (loss of knee jerks, tenderness of calves and paraesthesia) among the Malays, and this is borne out by the table which shows that the average intake of thiamin for the Malay group was much lower than the intake for the other two races.

"5. The vitamin A figures are apt to be misleading as very few foods such as eggs, butter and milk containing vitamin A *per se* were consumed. The calculated figures in the table are mainly from the carotene derived from the vegetable kingdom, and it is now established that diets containing vegetables as the main source of vitamin A should provide twice or three times the amount of carotene.

"6. The requirement in regard to vitamin C appears to be satisfactory, but bad cooking of vegetables as revealed by the surveys is conducive to considerable destruction of the vitamin C originally present in the raw uncooked vegetables.

"7. No classical signs of niscin deficiency were encountered. If, as recent work has shown, it participates in the healthy structure of skin, gums and tongue, then the deficiency is widespread.

"8. The one great drawback in all family dietary investigations is that these do not indicate the actual distribution of the foods consumed among the various members of the family. The results on the whole furnish us with certain generalizations of the food consumption and food habits. Inspection of the meals served to the families reveal the fact that adults consume most of the green leafy vegetables which are disliked by children. There is considerable difficulty in persuading children to partake of this valuable food in adequate amounts. The high incidence of simple gingivitis in children may be attributed to a deficiency of Vitamin C, and recent work has shown that members of the vitamins B such as niacin may also be involved in the maintenance of healthy gums.

"9. In spite of the difficult food conditions arising from the serious reduction in the rice rations introduced in the third week of August no actual cases of starvation were seen in the families surveyed though many were existing on semi-starvation diets. Supplements to the meagre rice rations were mainly in the form of bread, noodles, barley and other preparations of wheat flour such as fritters, pancakes, etc. Sweet potato and yams appeared in about 25% of the dietaries but tapioca was scorned. The almost universal dislike to tapioca is undoubtedly due to the unfavourable impression it created during the period of Japanese occupation, when it formed the main supplement to the rice rations of the majority of the working class. At that time good protective foods were scarce and very expensive, and most of the people were unable to supplement the tapioca diets, with the result that gross deficiency diseases such as beri-beri and protein oedema were rampant.

"10. Certain food habits adopted by the majority of the families tend further to diminish the intake of the essential food factors. These include the

thorough washing of rice thereby leaching most of the vitamins and the mineral salts, the improper cooking of vegetables leading to rapid and almost complete destruction of the vitamin C, and monotony in the preparation of the meals.

"(c) *Nutrition Surveys*:

(i) *School children.* Nutrition surveys were conducted on several schools which were largely attended by children of the poorer class. Not only schools in the urban and rural areas were examined but a few vernacular schools in the neighbouring islands were also visited. A total number of 8,295 children were submitted to a simplified clinical examination as to their state of nutrition. The examination was focussed on those bodily blemishes of nutritional origin which are known to be more or less prevalent among the school children, such as lesions of the mouth, tongue, eyes, gums and skin, decayed deciduous teeth and the general condition of the child. In a few schools the heights and weights were recorded.

Of the total number examined 55% were Malays, 43% Chinese and the rest was made up of various other nationalities. The number also included 1,602 girls. The results were as follows:—

Total Number of children examined ..	8,295
Boys	6,693
Girls	1,602
Thickened conjunctiva (grade III) ..	235 (3%)
Bitot's spots	21 (0.2%)
Decayed deciduous teeth	90% in children showing deciduous teeth.
Swollen (including bleeding) gums ..	2,318 (28%)
Magenta (including swollen) tongue ..	1,758 (20%)
Eroded tongue	386 (5%)
Angular stomatitis	240 (3%)
Dry skin only	2,764 (33%)
Dry mosaic skin	857 (10%)
Phrynoderma	85 (1%)
Musculature poor	24%
Poor physical condition	40%
Moderately good state of nutrition ..	30%

"From the results, briefly, it can be seen that gross signs of deficiency diseases are conspicuous by their absence but there is a high incidence of the minor manifestations of nutritional deficiency such as dry skin, lesions of the gum and tongue, decayed deciduous teeth and poor musculature. About 40% of the children were markedly undernourished. During the period of the British Military Administration of Singapore, nutrition surveys of the school children were carried out, and 16 cases of beri-beri and six cases of oedema were encountered. There was also a higher incidence of lesions of the skin, phrynoderma and Bitot's spots. A comparison of the state of nutrition of school children between the period of the British Military Administration and the period under review indicated an improvement, though not to the extent that one would have liked it to be. The stamp of malnutrition and undernourishment left by the Japanese is still evident among

school children and the prospects of obliterating it have not been brightened by the fairly serious food position during the latter half of the year.

"The worst fears that the serious reduction in the rice rations with the attendant increase in the cost of the other foodstuffs would have a retarding influence on the rate of growth of the children, a vulnerable group, were justified by data collected from one school. Periodical recordings of the heights and weights of the children attending this school were made during 1946 for the months of February, April and October respectively. The boys were mainly from the middle class. For the period of eight months the boys, although they grew taller, had either lost weight or made no significant increase. This was particularly evident among the boys from six to eleven years of page. With the older boys the rate of growth was definitely below normal.

"A table showing average heights and weights of 382 school boys will be found in Appendix 30.

(ii) *Children of pre-school age:* Most of the children examined under this heading were the children of families in which dietary surveys were made. They included the age group from two to six years of age. The results of the surveys were similar to those obtained with school children in that the minor manifestations of food deficiency diseases were highly prevalent and that 40% were markedly undernourished. It was found that the children of the slum areas in the most concentrated areas of the town showed greater signs of malnutrition than children in other areas.

"(*d*) *Feeding of School Children:* The finding that malnutrition was prevalent among school children led to a feeding scheme, initiated during the British Military Administration by the Singapore Executive of the Malayan Welfare Council for the provision of a nutritious morning meal to each school child. The object of this scheme was to supply a meal rich in one or more of the nutrients, which would make up the deficiencies present in the ordinary daily diets of the average school child. The scheme was run along three different lines as follows:—

(i) Meals supplied by a contractor under the control of the Department of Education.

(ii) A meal prepared from soup mix powder (a product obtained from South Africa) consisting of a mixture of dried milk, peas and dehydrated cabbage. This powder was analysed by the department and was found to be a nutritious mixture. In view of the destruction of vitamin C brought about during the cooking process fruit was recommended as a supplement and this was later adopted.

(iii) Meals prepared and supervised by the nutrition team. Prior to the transference of the nutrition team to the department, one school had already received at a low cost of 12 cents per meal varied menus which were designed to supply most of the deficiencies of the food factors, other than calories, to the diets of very poor Indian children. A nutrition survey previously conducted on this school showed a very much higher incidence of malnutrition than that found in other schools. The meals were first prepared in experimental kitchens by the members and were then introduced into the school. Later this feeding scheme under the guidance of the nutrition team was extended to include three

more schools and an orphanage. Supervision of the preparation and cooking of the menus recommended in the initial stages was carried out, and later surprise checks were frequently made to see that the standard of the meal prescribed did not deteriorate either in quantity or quality. Fruit was also given to supply vitamin C. In addition to the supervision of the meals the supervisor of the team was also responsible for the collection and delivery of foods obtained from the Food Controller to the principals of the schools concerned. Towards the latter half of the year the number of children receiving a nutritious meal daily under the direction of the nutrition team was about 1,700. There was marked improvement in the health of the children, especially in the Indian vernacular school.

"Basic dietary schedules for satisfactory school meals were recommended for schools which were fed by the contractor, and frequent visits were paid to the schools receiving the contractor's meals. It was found that unless there was strict supervision, the meals were bound to suffer in quantity and quality.

"It is reported with regret that the feeding of school children terminated at the end of the year through lack of funds, although there was considerable evidence to show that malnutrition was rife among school children. It is hoped that this stoppage is temporary and that when finances permit the feeding of school children, run on well-organised lines, will be introduced as early as possible. The provision of satisfactory meals to children of school age is a good national health insurance policy with dividends in the way of better health.

"(*e*) *Inspection of Communal Meals:* This department was frequently consulted over the question of providing cheap, wholesome and nutritious meals for the benefit of the wage earners who were most affected by the high cost of living. The opening-up of canteens for the public, such as the People's Restaurants organised and run by the Department of Social Welfare, and canteens for the working members of the staff such as those run by the General Post Office, Secretariat, Fraser & Neave, Singapore Harbour Board and elsewhere has been a redeeming feature in a bleak year of severe food crisis. The success of these canteens, especially the People's Restaurants, has been spectacular. In a single meal the individual obtained between 650 and 750 calories and at least $\frac{1}{4}$ to $\frac{1}{3}$ of the proteins, vitamins and minerals salts depending on the type of meal prepared. Not only was advice given regarding the composition of the meals served, but also frequent inspections were made by the members of the department to ensure that the standard of the meals served was maintained. As a result of these inspections, wherever possible improvements were suggested, and it is pleasing to record that these were usually adopted. The menus supplied by the People's Restaurants offered excellent propaganda in educating the public on the composition of nutritionally adequate meals. Excellent co-operation was maintained between this department and the Department of Social Welfare in their various feeding schemes.

"(*f*) *Dietary Schedules:* During the year, in order to cope with the fluctuations of the rice rations, suitable planning (and in most cases revision) of existing dietaries was carried out for prisoners, light-house keepers and inmates of relief camps. Menus of nutritionally adequate meals and their methods of preparation for the employees of the Sarawak Oil Fields were sent on request by the authorities in charge.

"(*g*) *Pilot Survey:* In November the nutrition team conducted a pilot survey for the Singapore Social Survey Committee to investigate certain practical problems relating to widows, orphans and the infirm.

"(*h*) *Miscellaneous.*

"(i) *State of Nutrition of Singapore:* Reports on the state of nutrition of the population of Singapore were furnished periodically to the higher authorities. Information was based mainly on nutrition and family dietary surveys conducted during the year under review. The general impression obtained is that the trail of under-nourishment left by the Japanese period of occupation had left its indelible mark on the population, especially on the vulnerable group, the children. The children were on the whole stunted. Some improvement had taken place in that no gross food deficiency diseases such as beri-beri were detected, and that there had been a diminution in the incidence of the minor manifestations of nutritional deficiency when results of the surveys during the British Military Administration and during the period under review were compared. A disturbing feature, due no doubt directly to the drastic rice reduction in August, was the effect of the difficult food conditions on the poor rate of growth of the children (*see* Nutrition Survey).

"Among the adult population, in spite of the food crisis, only six cases of mild beri-beri were noted in the families investigated, and they were all women. The capacity for hard and sustained work among the labouring classes was considerably below the pre-war standard. Inquiries from the various hospitals brought to light the information that the number of cases of beri-beri, a disease of nutritional origin, have dropped to a low level as compared with pre-war years. This comparative freedom from beri-beri is in the writer's opinion attributable to the following two main causes:

"(*a*) *A high vitamin B_1 calorie ratio in the diets:* It is now generally recognised that the vitamin B_1 requirement of human beings is related to the calorie intake (non-fat calories) and that diets containing less than 25.5 micrograms of thiamine per 100 calories are associated with a high incidence of beri-beri. In the family dietary surveys most of the families were found to be living on semi-starvation rations, which when calculated in terms of the thiamine/calories ratio per 100 calories gave a figure exceeding the beri-beri producing value.

"(*b*) *Rice substitutes containing more vitamin B_1 than highly-milled rice:* The grossly inadequate rice rations were supplemented in the main with wheat flour imported from Australia. The wheat flour was consumed in the form of bread, noodles, pancakes, etc., and it has been declared that the average imported wheat flour contains about 200 micrograms of thiamine per 100 grams of flour as compared with 18 micrograms for 100 grams of highly milled rice. In pre-war years highly-milled rice in large amounts was consumed by the people. Among the poorer class very few supplements of the protective foods were included in the diets, with the result that the diets became improperly balanced in regard to the thiamine/calorie ratio and deaths due to beri-beri occupied a prominent place in the mortality statistics.

"It must be mentioned that the food situation showed an improvement in December with prices of foodstuffs showing a downward trend due to various reasons such as increased imports of foodstuffs, restoration of the rice rations to the pre-August 18th level, and the dumping of very larger amounts of surplus army stocks of tinned foodstuffs in the open market."

Notes on Present Nutritional Status in Singapore

The general nutritional state in Singapore was appalling on the liberation. There was definite starvation at that period and no one wants to return to such conditions. Thus to state that there has been a considerable general improvement since September 1945 is not to indicate a happy and satisfactory present picture. Far from it, in regard to the poorer classes of the population. Very serious shortages of staff in all directions and particularly in trained medical and nursing staff have limited statistical data to a minimum, but extended observation has shown that the nutritional problem here now is the build-up of a ravaged population to a state of health whereby its adults can turn out an adequate amount of work and its children can become reasonably satisfactory citizens. Most of the children show stunted growth and a very poor musculature.

The physicians record what appears to be an increased susceptibility to disease attack; child tuberculosis is certainly increasing to a serious extent. A worse feature is that the children are not growing properly even now.

Of over 8,000 school children examined, 90% showed some form of dental decay and some 40% can be said to be undernourished. This is the position under the existing ration scale. The effects of any further reduction should be obvious. Considerably increased expenditure on child feeding schemes will certainly have to be faced. The majority of our children here are nutritionally incapable of assimilating any educational facility offered them even today.

Ill-will and a surprising lack of discipline never experienced before the war now exists. Two strikes of menial staff recently paralysed the medical services. Undernourishment is thought to be an important factor.

10—Other Departments

HOSPITAL SHOPS AND CANTEENS

In July, 1946, when the General Hospital was taken over completely from the military authorities the difficulties of the Staff and in particular of the Hospital Servants in obtaining certain essential foodstuffs were very acute. Rice had been severely rationed, other common foodstuffs seemed to be in short supply in shops and markets and "Black Market" prices were the order of the day. Transport was difficult to obtain and expensive when obtainable; wages were inadequate. All these difficulties led to the second strike of the menial hospital staff within a six months period at the beginning of August. This strike led to a paralysis of normal hospital activities and would have meant cessation of an essential service if Army and surrendered enemy personnel had not been available. Thus it became a matter of urgency for the Medical Department to take steps to alleviate these conditions as far as possible.

Government was approached for a loan of $5,000 to finance a shop and this loan was approved in August, being deposited in the Mercantile Bank in a special account. The management of this shop, situated in the General

Hospital, was entrusted to an officer of the Medical Department and with the invaluable help of the Controller of Supplies he was able to contact dealers direct and buy foodstuffs in bulk at the cheapest possible rates. From the shop these goods were distributed to the various hospitals on a *pro rata* basis.

At the beginning of the venture supplies were reaching the dealers erratically and were soon bought up. All dealers sold the goods on a strictly cash-down basis, so goods had to be foraged for and bought as opportunity offered. After goods became plentiful the shop became a great success, the business expanding rapidly. Additional staff had to be engaged to cope with the work.

A card system of hospital servants was introduced to ensure a fair distribution of goods. Purchases were restricted to foodstuffs and cigarettes, soap and such essential articles. No fresh food was purchased except for a short period for the Mental Hospital when no transport was available there for the hospital servants. Initially the main types of food bought were condensed milk, biscuits, cigarettes, jam, tinned meats, tinned herrings and the like. Later Australian eggs were bought. All goods, except milk and cigarettes, were sold from the shop at prices below controlled prices. Even so a few cents had been put on all articles to provide for running expenses and to cover any losses.

The shop was in running order when the strike of hospital servants ended on 13th September, and there is no doubt it helped to placate the hospital servants. After the strike settlement, which included a request by the strikers for a canteen to provide cheap meals, steps were taken to open a canteen to sell fifteen cent meals once daily except Sundays and holidays in all hospitals. These canteens were opened on 17th October. The meals were cooked in the Social Welfare Restaurant in Outram Road and collected from there in big containers by the hospitals. At the start approximately 1,000 meals were ordered and consumed but the novelty quickly wore off and gradually the number of meals dropped until in February, 1947 the meals ordered totalled 100. Many meals were left daily in the first months especially and so losses were incurred. The losses were debited to the "General Account", "Hospital Shops and Canteen." The meals not consumed were sent to charitable institutions daily. Extra staff to serve meals at the General Hospital had to be engaged where numbers were larger than in other hospitals.

One point about the distribution of dry goods has to be mentioned. At the Mental Hospital with its big staff, premises were given to a private Chinese to open a canteen and he was allowed to distribute goods sent from the main shop at the General Hospital. His profit from these goods was fixed at 50% gross profits—20% for Government transport and clerical expenses. He had to sell the goods at the rates fixed for all other hospitals. His net profit from this per month has varied from $176 to $75.

When goods became plentiful, all members of the staff were allowed to purchase from the shops and they have now become a very popular feature in the hospitals and at present it seems that we shall have to continue this activity at least for some time to come.

GOVERNMENT MEDICAL STORE

The Government Medical Store functions as a central supply department for stores and equipment required by all branches of the Medical Department in Singapore. After the termination of B.M.A., the Store continued to serve as a clearing house for Malaya in respect of medical supplies imported under the Young Working Party Scheme for the first period of rehabilitation. Pan-Malayan supplies for that period were shipped to Singapore and distributed

to the various centres in the Malayan Union by road, rail and sea. Arrangements were made for second period supplies for the central and northern medical zones of the Malayan Union to be consigned to Port Swettenham and Penang respectively, but supplies for Malacca, Johore and the East Coast States have been imported into and distributed from Singapore.

Conditions at the docks have rendered the clearance of shipments most difficult and, in common with other importers, there have been appreciable losses due to looting.

Stocks of drugs in the Store and in hospitals have been inspected and it has been found necessary to condemn and destroy considerable quantities of drugs of Japanese origin, which were of doubtful purity, also some pre-war stocks which had deteriorated and become unfit for use.

In view of the general shortage of medical supplies in local pharmacies, it has been the policy of the Department to endeavour to meet their requirements as far as stocks permitted and to assist general practitioners who would, otherwise, have been seriously handicapped. Assistance has also been given to Sarawak and British North Borneo; all such issues have been made on repayment.

The revenue for the period 1st April to 31st December was $71,276.65. The amount recoverable from the Malayan Union in respect of their share in the cost of handling Malayan Union supplies is approximately $47,500. The manufacturing unit, which is considered a most important part of the branch's activities and one which has saved Government large sums of money in the past, is still functioning in a very small way owing to lack of accommodation, equipment and staff.

Three robberies have occurred during the period under review resulting in the loss of approximately $100,000 worth of drugs and textiles. In addition, other attempts have been made to break into Store godowns.

The object of the centralisation of medical stores is to replace the fou- former hospital stores which functioned with a lack of adequate co-ordinatior as independent units. The result will be to eliminate the reduplication of work such as indenting, to establish a more efficient form of stock control with a corresponding reduction in the accumulation of "dead" stock caused by over-indenting, unforeseen changes in medical treatment and lack of systeman tic control of stores. It will enable the scope of the manufacturing laboratory to be extended, the advantages of which have already been mentioned, and the ultimate saving to Government will be very appreciable.

PART V

THE FUTURE

11—Medical Plan For Singapore

Now that the debates on the budget for 1947 have been heard the citizens of Singapore are sufficiently aware of their financial future for the purpose of this memorandum. The present would seem to be an appropriate moment to review the medical needs of the community in consequence; the moment to decide on a broad outline of the sort of medical and health service which is to be aimed at for the Colony of Singapore. The decision must be an important one because it affects the future well being of every man, woman and child in this Colony. It rests on a brutal cash basis: It must be taken now: 1947 must be the planning year.

Is the Colony to have a small organisation dealing only with the minimum of its acute disease, or is an adequate hospital service on European lines to be evolved?

No medical adviser could subscribe to the former conclusion. In the preventive field there is really no choice. Adequate control against epidemic outbreak from without and within cannot be avoided. A committee consisting of the Director of Public Works, the Principal College of Medicine, the Surgeon General Hospital, the Chief Medical Officer, the Government Architect, the Secretary General Hospital with the Director of Medical Services has attempted to solve the medical problem in these pages. The Chief Health Officer, the Professor of Dental Surgery and the School Medical Officer have aided the Director of Medical Services in assessing the preventive aspects of the question.

What is the position which faces us today? After four years of enemy occupation and one year of struggle in keeping a small medical service on its feet, it may be summarised as follows:—

	Approximate Bed Strength	
Hospitalisation.	*Now*	*Before*
General Hospital	550	700 V.D.
Kandang Kerbau	200	200
Tan Tock Seng	200 (+ 200 T.B.)	600
St. Andrews	Base Medical Stores	60
St. Andrews Orthopaedic	60	60
Approximate total general beds:	*1000*	*1600*
Prison Hospital	50	50
V. D. Hospital	70 3rd class	Included in general.
Infectious Diseases Hospital ..	250	250
Leper Hospital	300	2000
T. B.	200 in T.T.S.	?

Thus excluding, and rightly, mental disease and lepers, two conditions which have always been treated in separate institutions, the total bed strength today is only some 400 less than the pre-war and this with a reduction in medical staff in all directions, a result which would have been considered a practical impossibility in normal times, a staff which has been seriously over-worked for many months. Yet the amount of work which has been covered by this seriously depleted organisation is approaching the pre-war. As many cases have

gone through our wards and clinics during the last few months as in any pre-war year. The significance of this statement cannot be over-stressed, and the public should note it in connection with the difficulties which had to be faced. Lack of doctors, lack of nurses, lack of other personnel, shortages in equipment; these are some of the factors which must be borne in mind in assessing the remarkable effort which has been made by the medical staff in maintaining a service which has guaranteed that no acute disease which demanded our attention should be turned away from our hospitals however crowded the wards available, however tired the staff.

On the opening up of the hospital system during the months since the re-occupation the opportunity has been taken to re-organise and re-equip on a more modern system than the pre-war. Although the public cannot fail to realise by the time it has absorbed this brief review the unsatisfactory hospitalisation it must face over the next few years, it must be made aware of the fact that the re-organisation of Singapore Hospitals was discussed for years before the enemy occupation, and that plans were in mind in 1941 for considerable improvement. Sir Richard Needham, during his visit to the College of Medicine on behalf of the General Medical Council in England, severely criticised the existing organisation in 1934 and again in 1939, particularly the lack of any proper out-patient system and the absence of "units". A governmental committee laid down an interim plan for the General Hospital which was under action when the war broke out here and planning for an extended maternity hospital was also being done.

Thus it will be clear than an expensive and far-reaching hospital re-organisation was found to be necessary before the occupation; a complete overhaul is imperative now if even minimum needs are to be met. This is the ideal opportunity before large sums of money are wasted in attempting improvements which will satisfy no one. Without the scheme envisaged, inefficiency will grow with rapidity, and not only will the service given at present fall back with growing public clamour but the high standards which the public has a right to expect will become an impossibility.

A word about the "unit" system which is being adopted, and a concentration of general acute disease at the General Hospital with women's diseases and midwifery at Kandang Kerbau. Prior to the war both the House Surgeon and the Specialist found themselves searching for their patients in many wards. As a walk round these can cover some 4 miles or more in the General Hospital alone it must be clear that a large proportion of the patients failed to find the attention they expected. Each Specialist and his staff must have the patients in a group of contiguous wards, whether these are First, Second or Third class. He must in fact have his own unit to his hand. This is the modern European practice. It is certainly the only satisfactory one from any point of view. A concentration of acute disease in the only 2 reasonably satisfactory medical buildings in the city is really the start of the plan to use existing buildings to the limit of their capacity. It is thought by some that a return to the pre-war procedure means better accommodation for first class patients, particularly women. This is a fallacy. It will take many months to produce the staff and accommodation required to give first class patients the attention they expect. In any case our scheme will produce conditions at least comparable to those of 1941 by 1948.

Tan Tock Seng Hospital will have to take its proper place in the general hospital system, and take the over-flow of the poor patients from the General Hospital. The Singapore hospital system seems to have almost eliminated the poor during the Japanese Occupation. The service seems to have become one primarily for the lower middle class. Whatever the pre-war practice this is still the position unfortunately. We have thus to accustom ourselves to dealing

with the very poor on a proper scale. This means propaganda, and before propaganda, the necessary beds. As it is the medical staff is inundated with those who can pay something however small, and we cannot deal adequately with these. We are convinced that there is a really poor class in this city which has not been adequately tapped by our social services as yet, except in the field of venereal, of mental and infectious disease, and perhaps in infant welfare work. Such a section must be our future primary aim.

Nothing can really be done for chronic disease in this city today. All we can do is to try and treat what acute disease reaches us before it is too late, but even this has to be turned adrift at the first possible moment for the next case, third class patients to Tan Tock Seng up to a limit of 200 beds, and first and second class patients to their homes to convalesce. Such conditions as T.B. are not in the category of acute disease. Yet an attempt to deal with some 200 such patients is what we are doing and have done since the re-occupation. That these cannot be adequately treated should cause no surprise, this emotion should be reserved for the fact that even an attempt is made in this direction when every bed is required to keep the main stream of desperately sick at a really proper level. Rest and good food is given and as much medical care as circumstances permit, and this is all that can be expected for a long time to come in such cases. It is doubtful if even these cases of T.B. should be accepted under the conditions which exist in Singapore today.

The Leper Hospital has received more patients since the liberation than at any previous time in its history. Thus accommodation provided for some 200 pre-war cases has had to cope with nearly double that number. This congestion has been relieved by the transfer of some of the patients to Sungei Buloh. A policy as to future practice is under investigation.

Accommodation for some 500 people now exists in the Mental Hospital, but further progress will be slow owing to the very serious damage done during the Japanese Occupation. Mental cases cannot be placed in adequately protected wards and that is the present situation. That many more than the present numbers will have to be accommodated as soon as possible is only too clear to those who are acquainted with the problem. Progress here is entirely a matter of labour, and the material available.

Dispensaries and Clinics

Apart from one general urban dispensary and a travelling rural one under the control of dressers, only two crowded and very unsatisfactory general hospital out-patients departments are in touch with the adult population at the moment. In fact the existing out-patients service can be said to be totally inadequate in every way however strenuously the depleted medical and nursing staffs working in these sections strive. Municipal clinics only deal with children up to two years of age, while rural clinics can do little more. A School Medical Service is functioning with one clinic and a totally inadequate staff. Thus while the majority of the people cannot get minor medical attention at all, nothing has ever been done for the pre-school child, the child between 2 and 6 years of age. While concentration had to be made on all classes of the community during the British Military Administration period because of their seriously depressed and malnourished state, all the clinics then in use have now been turned back to their pre-war and proper use, *i.e.* to the assistance of the youngest and most susceptible section of the population. Only in the infant welfare field can attention be said to be reasonably adequate. But concentration on this age group with total neglect thereafter seems to be a shocking waste of effort. That many an unfortunate, both adult and child, who might bring his disease in a curable stage to a proper out-patient system, is barred from health and even life by prevailing conditions is all too clear to me.

The very acute shortage of beds in the early stages of the reorganisation campaign during the British Military Period necessitated the use of a separate institution for the treatment of venereal disease. This institution is within easy reach of the class most needing such attention, and it has proved to be such a success that all the experts concerned have recommended continuation of the policy thus initiated. The only trouble is unsuitability of the present building, the limitation in the number of beds available and the shortage of suitably trained staff. Only one V.D. clinic in the dock area is available apart from this hospital; first and second class patients are treated in the General Hospital.

Health Campaign

The Government Service is responsible for health control over the Island of Singapore outside Municipal Limits, and for total Port and Air control. Prior to the war this service had maintained a remarkable efficiency, and an essential one, in view of the paramount importance of this area in the field of world communications. After the liberation this happy state of affairs was found to exist no longer. All the carefully built up sanitary and anti-malarial control had so deteriorated that very extensive temporary measures had to be instituted to prevent a disease outbreak. Shortages in staff and materials have prevented anything in the nature of a proper re-birth however. This colony has been very lucky in that epidemics spread has been limited to small-pox and infantile paralysis. We are surrounded by territories less fortunate, and unless present measures are steadily enlarged and reinforced, a guarantee against further and more devastating sickness cannot be made. Such a result would have deplorable effects on local prosperity apart from the appalling costs a failure in our preventive measures would entail.

Government dental services are non-existent for the general public-child and adult. A teaching unit as a part of the College of Medicine is all that is possible today.

The Necessity for Further Measures

Based on European and Dominion standards an approximate of 4,000 general hospital beds, excluding all special disease, is a low minimum requirement for such an area as Singapore. It means more than double the existing accommodation however, but this is the figure which must be aimed at. It in one which should be sufficient to deal with all our acute disease. Even then we shall need extra hospitals to meet such activities as venereal disease, maternity cases on the present approach, T.B. and so on. I am taking it for granted that mental disease and leprosy will continue to be outside the scope of the ordinary hospital. We cannot possibly do with a smaller general hospital bed strength than this. The peoples of Singapore must face up to realities if they want their sick to be treated adequately. They must be prepared to pay for the minimum satisfactory service. All the drugs and equipment will soon be at hand. The thing to do now is to provide accommodation and staff. Both can and will be available if the proper approach is made. I have talked to local medical and nursing and midwifery graduates and these are not prepared to stay and work for the public unless the latter is prepared to give them what they think is a just and reasonable due.

Not half the hospital beds required are available today. The present staff is barely capable of dealing with 1,000 general beds if a total collapse is to be prevented sooner or later. The accident rate is some five times the pre-war; clamouring crowds besiege the Out-patients Department: no patient can receive proper post-acute treatment: only a fringe of the very poor has been touched.

Such statistics as are available would appear to indicate a better general health in Singapore than the pre-war. Nothing could be further from the truth in my considered opinion. While figures clearly show that many of the less robust died during the occupation period we have not felt as yet the true after-effects of the military struggle. Such observation as has been possible points to coming generations of very poor physique, generations far less able to stand the vigours of a normal life, a C. 3 population. Unless we are very careful many more hospital beds and clinics than I indicate will be required in the not too distant future. People complain with justice that they cannot waste the time required. More up-to-date out-patients departments, more hospital clinics, more and yet more beds are an urgent necessity. A great deal more must be done to give those in distress the service they need, and are not yet able to demand.

The anti-malarial scheme must be brought up to its pre-war level. Whether the new drugs such as D.D.T. and paludrine will be able to replace the older methods are matters requiring the most expert knowledge and attention. No one can pass a definite opinion at this stage. Whatever happens this Colony must be made free of such an obvious danger as malaria if it is to expand and even to exist satisfactorily. Similarly our sea and air ports must be acceptable to international commerce. This provision demands certain minimum requirements which are now the subject of anxious thought.

And finally medical teaching must be an integral part of the Medical Services if Singapore is to be the site for the new University. Standards in this connection will be those of the United Kingdom in equipment, accommodation and personnel.

Training of Personnel

Today the Civil General Hospital and Kandang Kerbau Women's Hospital, with the associated College of Medicine, have a nucleus of well qualified Asiatic and European specialists. These and other medical institutions which must arise in a few short years will require a sufficient staff to meet all demands. Provided the proper outlook is adopted now, one covering proper pay and accommodation, this country will be able to supply most of the medical staff it needs in due time. We must create either a sufficient medical centre here or elsewhere capable of meeting modern demands, or suffer the consequences. One of these will mean staffing from abroad. Trained medical and nursing staff takes a long time to evolve, and the public expects, and rightly, that such training shall be of the highest quality. The necessary nucleus is here. All we have to do is to build around it adequately.

Method of Advance

So in Singapore the development of the proposed policy merely means an extension of an already existing base on an adequate modern structure; the provision of suitably equipped buildings, both old and new; suitable and sufficient staff to deal with these, a teaching institution both medical and nursing capable of the new demands. An advance to such a goal can only be obtained over a number of years. The staff problem alone makes this a necessity. None the less real urgency exists. Full planning is required now, and a definite programme should be laid down and completed by the beginning of 1948. A five years scheme should be initiated on the following lines on the basis on an annual capital expenditure of some 10 million dollars.

SPECIAL CAPITAL EXPENDITURE:—

Two years, 1948–1949

Buildings	*Approximate cost in $*
Expansion and modernisation of the present General Hospital to 1,000 beds	10,300,000
Expansion and modernisation of Kandang Kerbau Hospital to 500 beds	6,750,000
Base Medical Stores	242,000
V.D. Hospital of 200 beds	4,574,000
Organisation of school, medical and dental services to meet the new educational demands—First stage	100,000
Expansion and modernisation of Tan Tock Seng Hospital to 800 beds	1,400,000
Rural clinics: seven centres	214,000
Rural Cooly lines and Overseers quarters—First stage	800,000
Sea and air port and health reorganisation schemes—First stage	370,000
Anti-malarial work and rural village drainage scheme—First stage	250,000
	25,000,000

Three years, 1950–1952

Buildings	*Approximate cost in $*
Second General Hospital of 1,000 beds	21,500,000
Mental Hospital Improvements	1,254,000
Expansion and improvements to Leper Hospitals—300 beds	780,000
Expansion of school and medical and dental service to meet educational demands—Second stage	100,000
Rural clinics and dispensaries: nine and three respectively	348,000
Final sea and air port and health reorganisation schemes—Second stage	270,000
St. John's Island water supply scheme	250 000
Anti-malarial works and rural village drainage scheme—Second stage	380,000
Rural Cooly lines and Overseers quarters—Second stage	1,200,000
	26,082,000

Additional Items for Special Consideration.

Additional major infectious diseases centre of 50 beds	852,000
Expansion and improvement of Orthopaedic hospital from 60 to 120 beds	1,067,000
T.B. hospital of 300 beds	5,817,000
	7,736,000

Summary of annually recurrent expenditure for the five-year period.

Average of 10 million dollars.

Summary of special capital expenditure annually for the five-year period.

Average of 10 million dollars.

Total expenditure average for the period 1948–1952.

20 million dollars per year.

Notes on the Above.

1. A hospital system capable of dealing with a population of some 200,000 people cannot deal with three of four times that number. Neither can it deal with an up-to-date medical school. That is a fundamental fact which has to be faced today. The existing accommodation is totally inadequate and out of step with modern demands.

2. The sums given in the above summary can only be very approximate. It is thought that $8,400 a bed might meet the case on present costs excluding staff accommodation. When present United Kingdom figures are taken into consideration the figure is not excessive. Housing of the staff is the burning question. All but the senior staff must be placed on the premises. One of the greatest difficulties in expansion today revolves around this question of accommodation. Staff cannot be obtained if there is nowhere to house them. And beds cannot be created without the staff to run them. From now on the fact has to be faced that all medical departmental staff, whatever the race or creed, must be *reasonably* housed according to occupational status. Today we cannot expect further medical personnel because we have nowhere to put them. The intake of nurses and sisters is strictly limited by this same factor. Appendix *A* gives an indication of costs in this direction if staff is to be housed on pre-war lines for the new 1,000 bedded hospital proposed. The cost is doubled thereby. Is the pre-war standard of housing to be reduced?

3. The approximate staff required for a teaching hospital of a thousand beds and for a hospital for maternity and women's disease is appended for information—Appendices *B* and *C*. Adequate staff will be demanded by London University or any institution which is to be connected with the new University College. This must be clearly realised if Singapore is to be the chosen site. The impression remains that the staff indicated is not excessive but rather the reverse. The staffing of the other medical institutions which are required in Singapore has been worked out in proportion to their relation to teaching and the type of disease to be catered for.

4. The cost of sites has not been included. This may be an expensive item but certain government property has been earmarked already. The new General Hospital will have to be sited on the opposite side of the town, more or less, to the existing General Hospital, and its siting may have an important bearing on the new University if it is decided to place this on Singapore Island.

5. The proposals put forward in this memorandum cover two general hospitals and although this scheme can be taken as the basis for argument, further consideration may suggest a building up of the existing General to one large and extensive hospital centre of some 1,800 general beds, with a small accident hospital of some 200 beds elsewhere in the town. At least five million dollars will be saved by this expedient.

6. The position of Tan Tock Seng Hospital will have to be carefully reviewed. This institution can be extended and modernised into a good secondary type of hospital and infirmary, and it should continue to be used for the overflow from the third class wards of the main general hospitals—its present chief function. It must continue to play an important part in the Hospital Scheme for Singapore, and must take its proper place in that scheme.

7. The treatment of women—and this includes maternity of course—has given rise to much anxious thought and consideration. Our aim must be to reach the very poor who cannot pay and so tend to be out of reach of our hospital system until it is too late and the final tragedy is enacted. But the better class, the paying patient, is not being forgotten. For the time being there is neither the staff nor the accommodation to meet the excessive—excessive by pre-war standards—demands now made on the Government organisation. This will be remedied in due course if the plans we are envisaging come into being.

8. Venereal Disease needs special consideration in view of the aftermath of the war and the advances which have been made in the treatment of the disease. A special hospital with treatment and follow-up concentrated in the most suitable areas of the town has led to unexpected and remarkable success in the present campaign. Better-class patients will, of course, continue to receive attention in the paying wards of the General Hospital. That confidence between patient and doctor which is an essential in such a condition will continue to be the key-note of work in this direction. There will be no coercive compulsion as far as the Civil Authority is concerned. An excellent beginning has been made in our new approach to this disease under very difficult and exacting conditions. The present building—an old Japanese hospital—is quite unsuitable in its present form as a medical institution. With proper up-to-date facilities I anticipate a most satisfactory expansion in the control of this most important of social evils.

9. The future of the present Orthopædic Hospital is a question which merits consideration. This institution is a part of the present St. Andrew's Mission. At the moment it is run by Government and is serving an essential purpose in the treatment of infantile paralysis, nonpulmonary tuberculosis, and similar conditions in children in the existing hospital scheme. It should be expanded to at least double its present accommodation and work as an integral part of the hospital services under specialist supervision.

10. The Base Medical Stores is housed in the old St. Andrew's Mission hospital in the town. A hospital service such as that envisaged here demands a properly controlled and centralised stores system as an essential, and until one is established this building cannot be evacuated. It is in any case hardly suitable for a hospital. Such a small institution within a stone's throw of a large general hospital means a serious waste of nursing staff and other personnel. Its continuance on pre-war lines cannot be recommended if the medical benefit of the public is the first consideration.

11. The existing Infectious Diseases Hospital is a Municipal concern, operated by both Government and Municipality at the moment. After consultation with the Municipal Health Officer the suggestion is made of an expansion in this direction by the opening of a 50-bedded institution for major infectious disease outside Municipal Limits, the present organisation being used for minor disease of this type.

Infectious disease control is so intensely bound up with the general preventive services, and so with the Quarantine Station at St. John's Island, that essential expansion must be approached from the broadest angle of thought. St. John's Island is only suitable for third class patients in a modern build-up.

The quarantine station requires additional expenditure on it in any case. A more modern water-supply system was under consideration prior to the war, and it is most desirable that the question of the provision of a good local supply should be re-opened forthwith. This quarantine station is Singapore's main line of defence against imported disease, and it, and its connected services,

must be maintained on the highest priority basis. Thus the pre-war launch and passenger services must be re-established without delay. Two modern launches and two passenger flats will have to be purchased. At the moment water is transported to the island at regular intervals and two small R.A.S.C. launches only are at hand. During recent months between 1,000 and 2,000 inmates has been a frequent occurrence, and the use of the island it likely to increase as time goes on.

Port and Air Quarantine, and thus the control of infectious disease, must always be a priority matter in Singapore. Any real breakdown in this service would mean many times any expenditure the health authority is likely to demand. The danger point has been within reach on more than one occasion over the past months, and shortage of staff and adequate quarantine accommodation is a matter of very serious consequence at the moment. Not only is medical and inspectorial staff less than half that required, but lack of essential buildings at our air centres means that the necessary international obligations cannot be enforced properly. The R.A.F. is doing what it can to help but it must be realised that this is a civil responsibility which has to be met if Singapore is to remain on the communications map of the world. That we must take our proper place in this setup is clear to both commercial and Government interests alike.

12. The vexed question of T.B. has been to the fore since the elimination of the Japanese but the public must realise that this disease has to take its proper place in the medical scheme. Until we can deal adequately with our acute disease it would be a tragic mistake to concentrate our energies on such a vast problem as this. When the funds have been provided for our *essential* medical services then we can afford to expand in other directions such as tuberculosis. This is not to say that T.B. is not of the utmost importance to the public health, but unless we are prepared to remove sufferers entirely from our slums and organise a vast re-settlement scheme on proper lines, we must move step by step. Housing and malnutrition are just as important items in this connection as medical treatment. Observation would appear to indicate that there was a considerable increase in T.B. over the enemy occupation period which still persists. This is a pointer to the grave under-nourishment which has occurred and which still continues even if in a less obvious form.

The formation of a non-government Anti-Tuberculosis Society is under consideration by some of our citizens. It will conduct surveys and establish one or two up-to-date clinics in this city under expert direction, and this would appear to be the immediate answer to the problem. The sanatorium idea can then be developed later on when we are in better position to do so.

13. *Rural health and school medical and dental services:* Thus far it has been mainly the curative side of our services to the public which has been dealt with as deficiencies in this respect are so obvious and so closely allied to current criticism. Preventive medicine must take its full and proper place in any medical scheme however, as the old adage that prevention is better than cure was never nearer the mark than it is today when our coming generations are in such a depressed state of health. Any competent observer can soon satisfy himself on this point. Thus the need for first class school medical and dental services and a full-scale pre-school clinic scheme.

Infant Welfare Services dealing with children up to two years of age are covered by the Municipal Commission within city limits. While a similar service was steadily developing before the war in Rural Singapore, and much good work had been done in the schools, the Government organisation had no satisfactory accommodation. The time has come when we must do a good

deal more in this direction if future hospitalisation is to be kept within the minimum limits indicated above. After some 20 years of rural maternity and child welfare work not one really up-to-date centre is in existence. Some function in old shop-houses, while one is held in a cooly line and another in a police pound. It is only the enthusiasm of the Public Health staff and the co-operation of the public which has enable the existing service to carry on. Sixteen centres are proposed over the next five years apart from one or two which local Chinese communities are proposing to build for themselves.

And nothing has ever been done for the pre-school child in town or country until the feeding scheme approved a short time ago started to function. These children will be dealt with in the special hospital and rural clinics envisaged, and in special units in the hospitals, as soon as sufficient staff and accommodation are available. This is a vital and essential field which must be covered at the first possible moment.

While pre-war there were seven Health Officers—three women and four men—to carry out examinations and treatment of school children, only two lady doctors are available today for this work for which no accommodation exists. As it is estimated by the Educational Authority that up to 100,000 children will have to be dealt with regularly in the school scheme in the not too distant future the existing state of affairs from the medical side can only be described as deplorable. Sufficient staff and clinics to deal with this problem cannot be long delayed without very serious results for the coming generations.

No school dental service exists at all. It is estimated that at least 75% of our children suffer from dental caries. The sooner this service is started the better for all.

Re-organisation in the Rural Dispensary Service has already started by the provision of Travelling Dispensaries in the 1947 Estimates, and the gift of one by the Rotary Club of Singapore. Two static dispensaries exist at Bukit Timah and Paya Lebar. Three more are essential in the more outlying and densely populated areas.

With the money voted for 1947 it is hoped to complete the repair to most of the permanent anti-malarial drainage system necessitated by the damage caused during the Japanese Occupation. It will then be necessary to continue a considerable programme of new construction for the more densely populated rural areas where large sums are being spent at the moment in carrying out open ditching and oiling. This work is bound up with sullage drainage in the villages where no means exist at present for the removal of large amounts of water. Village populations seem to have spread over the Island during the last few years, and this fact in conjunction with the influx of Service personnel in new districts means a considerable increase in the pre-war anti-malarial control. The estimates given however only cover anticipated civil expenditure in this connection. The Services are prepared to fully co-operate and the Singapore Public Health Conference is at work already on these lines. While malaria has been kept under reasonable control since the re-occupation by wide-spread and energetic but extensive temporary measures, a serious epidemic of this disease is always round the corner. So no relaxation in operations and expenditure is possible until the permanent scheme has been completed.

14. *Annual Recurrent Expenditure:* The annual recurrent expenditure for the Singapore Government Medical Department for 1947 reaches a total of some seven million dollars to cover a service approximating in staff and scope of the 1941 level as compared to an expenditure of some three million dollars during that period. This increase is due in the main to increased cost of food, drugs, equipment and other materials.

It is clear from a perusal of the foregoing that the increased services envisaged will mean a very considerable development in staff of all kinds and in particular in medical and nursing personnel: in drugs and equipment. A considerable rise in salary scales in general must be accepted over present rates if we are to continue any sort of service. On the other hand actual costs of food and drugs and equipment is bound to decrease considerably over the period.

A careful analysis of all the facts concerned has led me to think that an *average* of some 10 million dollars per annum over the five-year period under review should suffice to cover annual recurrent expenditure.

15. And finally a note in connection with the population to be catered for. It has been stated that one-fifth of Singapore's population is in the nature of a floating surplus and thus that there is no need for this Colony to bear medical costs in this connection. Such a view cannot be accepted by any responsible Medical Authority. Not only has careful research suggested that any estimate of the percentage of the non-stable section of the population is impossible on the statistics available, but whatever figure is accepted, common humanity and expediency demand that the poor man must be dealt with medically whether he is within our gates 10 weeks or 10 years. There will always be a steady but very minor flow of the well-to-do to a large medical centre such as this. The policy should not be to refuse these but to make them pay for the privilege.

W. J. VICKERS,
Ag. Director of Medical Services,
Singapore.

SINGAPORE, 11*th February*, 1947.

APPENDIX I

TOTAL NUMBER OF (*A*) AUTHORISED AND (*B*) AVAILABLE SPECIALISTS, MEDICAL OFFICERS (M.M.S. & L.M.S.) MATRONS

Nursing Sisters, Nurses and Dressers, 1941 and 1947

No.	Heading	1941		1947	
		Autho-rised	Avail-able	Autho-rised	Avail-able
1	Specialists	13	10	15(*b*)	10
2	Time-Scale M.O.'s and H.O.'s	10	10 (including Anæsthe-tist)	10	12
3	Local appointed Medical Officers	76	69	82 (including 7 Clinical Assis-tants)	35
4	Matrons	7	7	7	7 (6 acting)
5	Sisters	60	53	58(*a*)	30
6	Nurses	297	285	320	250
7	Dressers	174	174	180	162
	Total ..	637	608	672	506
8	Dental Staff	8	8	8	5
	Total ..	645	616	680	511

(*a*) Excluding 1 Senior Supervisor, Social Hygiene, 3 House Superintendents and 1 Radiographer.

(*b*) Including Clinical Professors of the College of Medicine, the Ophthalmic Surgeon, Radiologist, Physician, Surgeon and T.B. Officer of the General Hospital, and also the C.H.O., S.M.O., S.H. and M.S.M.H. and *excluding* D.M.S., Govt. Pathologist and Assistant Pathologist.

APPENDIX I—*continued*

KANDANG KERBAU HOSPITAL

Item	Head	Medical Plan 500 (*a*)	Actual 200 (list 280) (*b*)
24	Professor	1	1
	Assistant Professor	1	..
	Medical Officer	14	5
25	Matron; Class I	1	1
	Assistant Matron	1	..
26	Sisters	35	8
27	Hospital Assistants	6	5
28	Laboratory Assistants	9	1
29	Senior Staff Nurse and Staff Nurses and Staff Midwives Nurses Midwives	285	107
30	Hospital Servants	400	161

APPENDIX I—*continued*

SOCIAL HYGIENE BRANCH

List showing:— (*a*) Estimated Staff for 200 bedded V.D. Hospital and O.P. Department (including Tanjong Pagar Clinic)

(*b*) Establishment Staff of the present 70 bedded V.D. Hospital and O.P. Department (including Tanjong Pagar Clinic).

(*c*) Existing Staff.

Office	Number of Staff		
	(*a*)	(*b*)	(*c*)
Senior Medical Officer	1	1	1
Medical Officers	6	4	1 1 part time.
Matron	1	..	..
Sister	1	..	..
Senior Supervisor	1	1	1
Supervisors	12	12	9
Trained Pathologist	1	..	..
Hospital Assistants	20	3	3
Dressers Grade II and III	44	15	11
Senior Staff Nurse and Staff Nurses ..	18	6	4
Trained Nurses	28	12	3
Probationary Nurses	12	..	3.
Female Clerk	1	1	1
Clerks	4	2	2
Peon	1	1	1
Male Attendants (including Jagas, Cooks and Drivers)	62	22	20
Female Attendants	36	19	10
Total ..	249	99	71

APPENDIX II

LEGISLATION

The following Ordinances were passed during the nine months under review:—

1. An Ordinance to amend the Medical Registration Ordinance.—A Bill designed to rename and re-constitute the Medical Council established under the Medical Registration Ordinance and to provide for the several consequences arising from the constitution of the Malayan Union; to clarify the position of Medical Officers of His Majesty's Service.

2. An Ordinance to amend the Hospitals Board Ordinance.—A Bill providing for the re-constitution of the Hospitals Board, rendered necessary by the exclusion of Penang and Malacca from the Colony.

3. An Ordinance to amend the Registration of Births and Deaths Ordinance.—A Bill providing an extension of the time limit up to the age of eleven years, for the registration of children, to permit those parents not in the colony durnig the period of Japanese occupation to make application for registration.

4. An Ordinance to amend Part 1 of the Poisons list in the schedule of the said Ordinance as follows:—

to include (*a*) all members of the sulphonamide group.

(*b*) Penicillin; its salts and their preparations.

5. An Ordinance to amend the Quarantine and Prevention of Disease Ordinance.—A Bill allocating additional powers to the Director of Medical Services, in the event of the outbreak of epidemic.

APPENDIX III

GOVERNMENT HEALTH DEPARTMENT

SINGAPORE

European Staff — *Locally Appointed Staff*

Qualified Staff	Chief Health Officer	Health Officers	Health Officers Locally appointed	Quarantine Station		Total
				Medical Officers Locally Appointed	Lady Medical Officer	
Present Staff	One Super Scale "B" Post	3 (Including one Lady Health Officer Schools)	5 (*a*) 1 Port Health Officer (*b*) 1 Lady Health Officer Schools (*c*) 1 Health Officer Airport (*d*) 1 Health Officer Vaccination and Inoculation (*e*) 1 Health Officer Anti-Malarial	1	..	10 Medical and Health Officers
(*a*) Pre-war Staff and (*b*) Staff provided for in 1947 Estimates	(*a*) Chief Health Officer Super Scale "A". (*a*) Deputy Chief Health Officer (*b*) One Super Scale "B" Post.	(*a*) and (*b*) = 4 Pre-war one of these was the Deputy Chief Health Officer, and one Lady Health Officer Schools	(*a*) and (*b*) = 12 (*a*) 2 Port Health Officers (*b*) 1 Health Officer for vaccination and inoculation and Rural Health work (*c*) 4 School Medical Officers (*d*) 3 Airport Health Officers (*e*) 2 Lady Health Officers Schools	(*a*) and (*b*) = 2	(*a*) and (*b*) = 1	20 Medical and Health Officers

2. There are 10 vacancies on the Establishment provided for in the 1947 Estimates:—One European and Nine Locally Appointed Health Officers (including two Lady Health Officers). This shortage of qualified staff is a most serious matter as the quantity of work has more than doubled since 1941. This means that certain Public Health measures have had to be cut to a minimum or eliminated altogether. For example, the School Medical Service is but a shadow of its pre-war self, and is practically non-existent on the male side. There is no School Dental Service; yet the number of school children has increased considerably—there are now 88,000 children on the rolls.

3. There is one Airport Health Officer, who deals with Kallang Airport, in addition to carrying out the duties of Licensing Officer to the Rural Board. Both Changi and Seletar Airports are without Health Officers, and this is a serious matter in view of our obligations under the International Sanitary Conventions. Port Health work has increased considerably, and is carried out by one full time Health Officer, and one part-time Health Officer who also performs the duties of Health Officer Quarantine. This staff should be increased by at least two more Health Officers in order to carry out the work efficiently. There are five Port Health Officers in Hong Kong to deal with Port and Quarantine work.

4. The issue of valid vaccination and inoculation certificates under the International Sanitary Conventions now requires the full time services of a Health Officer, who formerly carried out School Medical duties. In addition to the above staff, there is one Chief Sanitary Inspector who is in charge of anti-malarial work in the Rural Areas. In addition to routine measures which are more or less similar to those carried out pre-war, he has to supervise "Rehabilitation work" involving hundreds of thousands of dollars.

5. One Public Health Matron and two Health Sisters (as pre-war) supervise the Maternity and Child Welfare Section, but here again the work has increased considerably, and there is a shortage of subordinate staff.

6. Unless something is done soon to increase our numbers, I fear there will be serious breakdown among the overworked members who are at present trying to carry out the multifarious duties of this Department.

7. Finally there is the question of the Royal Sanitary Institute Course of instruction, which it was hoped might be re-started in June, 1947. In view of the shortage of staff, however, it would be quite impossible to undertake the re-organisation and running of this course this year. At least one additional full time Health Officer will be required to do this, if the course is to function on proper lines.

APPENDIX IV

OTHER INFECTIOUS DISEASES

(Including Rural Cases Notified by Middleton Hospital)

For period 9 months April—December, 1946.

Tuberculosis	258
Chicken Pox	37
Diphtheria	31
Typhoid and Paratyphoid	16
Cerebro Spinal Meningitis	3
Leprosy	15

APPENDIX V

CONSERVANCY

No. of bucket latrines serviced	4,942
,, ,, ,, found to be insanitary ..	1,434
,, ,, ,, reconstructed	400
,, ,, ,, demolished	326
No. of Septic Tanks repaired and serviced ..	67

RUBBISH DISPOSAL

Daily amounted disposed of by controlled tipping	8 tons
,, ,, ,, ,, composting ..	5 ,,
,, ,, ,, ,, incineration ..	½ ,,

APPENDIX VI

No. of Dangerous and Offensive Trades licensed ..	277
No. of houses inspected	9,488

APPENDIX VII

SCHOOL MEDICAL SERVICE

No. of schools on register	386
No. of children on rolls	87,802
No. of new schools registered	61
No. of children medically examined	7,422
Percentage found in poor condition	49.4%
No. of children receiving worm treatment ..	59,397
No. of vaccinations carried out	22,815

APPENDIX VIII

REPORT ON PORT HEALTH WORK DURING THE PERIOD 1-4-46 TO 31-12-46

With the resumption of Civil Government on 1-4-46, the whole of the Quarantine and Prevention of Disease Ordinance 1939 and Quarantine (Medical) Rules 1937 came into force and all shipping agents were informed accordingly.

Summary of work done during the period under review:—

1. No. of ships inspected—732 (arriving from a total number of 1,237 ports and representing a total net tonnage of 2,541,694).
2. No. of crew and officers inspected—75,196.
3. No. of passengers inspected—91,441.
4. No. of Infectious Diseases:—

	Cases	*Deaths*
Plague	Nil	Nil
Cholera	,,	,,
Smallpox	,,	,,
Pulmonary Tuberculosis ..	5	,,
Yellow Fever	Nil	,,
Typhus Fever	,,	,,
Cerebro-spinal Fever	,,	,,
Other Infectious Diseases ...	6*	,,

5. No. of ships inspected for issue of Deratization Exemption Certificates—468.
6. No. of D. E. C. issued:—116.
7. No. of ships disinfected:—15.
8. No. of junks and small craft inspected:—4,212.
9. No. of crew and passengers (arriving by these crafts) inspected:—48,969.

KALLANG AIRPORT

For the period 24th March, 1946, to 31st December, 1946:—

203	Aircraft were examined.
2,091	Crew were examined.
1,315	Landing passengers were examined.
1,437	Transit passengers were examined.
4,813	Total number examined.
9	Passenger Undertakings were issued.

The following were the Airports, against which, Quarantine measures were declared during the year:—

Cholera — Bangkok, Calcutta, Hongkong.
Smallpox — Bangkok, Rangoon, Calcutta, Singapore, Hongkong, Penang.
Plague — Rangoon.

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*Chicken Pox = 4 Measles = 1 Dysentery = 1

APPENDIX IX

ST. JOHN'S ISLAND, QUARANTINE STATION

Yearly Return for 1946

1.	Total no. passengers admitted during the year ..	3,196
2.	Greatest no. admitted on any one day (6-6-46) ..	1,000
3.	Maximun no. in residence on any one day (7-6-46) ..	1,332
4.	Minimum no. in residence on any one day ..	4
5.	Total deaths during the year in hospital ..	3
6.	Death rate per mille amongst passengers admitted ..	1
7.	No. of Municipal Contacts who developed infectious disease on the Island	2
8.	Average stay of Contacts	9 days.
9.	The passengers are sub-divided as follows:—	

	M.	*F.*	*C.*	*Totals*	*Grand Total*
Chinese ..	1,000	313	229	1,542	3,196
South Indians ..	1,262	84	51	1,397	
North Indians ..	91	20	19	130	
Malays ..	27	32	43	102	
Eurasians ..	4	6	9	19	
Others ..	5	1	..	6	

10.	Total No. of vaccinations done	2,684
11.	Total No. of Re-vaccinations done	72
12.	Deaths during the year in hospital	3
13.	Daily average in hospital	.08
14.	Out-door patients treated	1,418
15.	No. of gallons of Singapore water pumped up ..	2,169,120

16. *Infectious Diseases*

	No. of Cases	*No. of Deaths*
1. Yellow Fever	—	—
2. Typhus Fever	—	—
3. Plague	—	—
4. Smallpox	2	2
5. Scarlet Fever	—	—
6. Enteric Fever	—	—
7. Erysipelas	—	—
8. Pyaemia	—	—

APPENDIX X

RURAL HEALTH CLINICS

Maternity and Child Welfare Work

From 1st April—31st December, 1946

Health Nurses' Work	Pasir Panjang	Bukit Timah	Bt. Pj. and Lim Chu Kg.	Seletar	Paya Lebar & Y.C. Kg.	Tai Seng & Upper Serangoon	Malay Settlement	East C. Rd. & Ulu Bedok	Changi & Pulau Ubin	Pulau Tekong	Grand Total
Home Visits made by Health Nurse ..	2,103	3,447	4,036	3,297	3,225	1,914	5,160	1,640	3,729	12	28,563
Ante-natal attendances at clinics ..	1,758	1,395	1,622	1,391	420	209	683	1,226	144	135	8,983
Post-natal attendances at clinics ..	461	524	987	445	378	246	313	394	557	379	4,684
Infants under 1 year 1st visits	845	1,308	863	853	1,176	663	639	871	257	108	7,583
Infants under 1 year revisits	5,381	3,133	4,200	4,129	3,964	2,157	2,326	4,003	1,256	964	31,513
Children over 1 year examined	1,334	2,652	1,688	1,005	3,468	640	1,271	258	1,149	333	13,798
Children over 1 year treated	3,054	4,744	3,148	2,114	453	1,493	3,373	1,878	908	396	21,561
Private midwives attending clinics ..	69	32	9	..	74	10	5	47	4	..	250
Total number of session at clinic ..	193	141	140	136	180	94	113	154	78	25	1,254
Vaccinations	1st April to 31st December, 1946.										34,898
Midwives' Work											
Attendances at confinements	405	509	688	629	239	8	255	411	69	104	3,317
Home visits to ante-natal cases	312	442	600	582	216	4	52	263	43	94	2,608
Nursing visits to mothers and children ..	2,185	3,028	3,519	2,552	1,529	5	1,544	2,450	257	662	17,731
Patients in labour taken to K.K. Hospital ..	13	8	11	24	1	..	3	6	..	2	68

APPENDIX XI

TRAVELLING AND OUTDOOR DISPENSARIES

For period 9 months April to December, 1946

	New cases	*Re-visits*	*Vaccinations*
Travelling Dispensary ..	2,668	3,876	5,254
Bukit Timah Dispensary ..	4,779	8,739	2,732
Paya Lebar ,, ..	6,411	9,469	3,061
Pulau Brani ,, ..	1,426	4,161	815

APPENDIX XII

OUT-PATIENTS

For period 7 months June to December, 1946

The number of persons treated as out-patients at Government hospitals was 71,230. They were distributed as follows:—

Hospital	New Cases	Repetitions	Total
General Hospital	22,137	24,295	46,432
Kandang Kerbau	26,443	31,817	58,260
Tan Tock Seng	8,792	8,747	17,539
Social Hygiene	6,251	20,375	26,626
Police Hospital	2,500	2,796	5,296
Female Clinic	5,107	5,428	10,535
Total ..	71,230	93,458	164,688

APPENDIX XIII

HOSPITALS, DISPENSARIES AND CLINICS

Hospital In-patients

The following table shows the hospitals maintained by the Medical Department, Singapore, the average daily number of patients in each, the number of patients admitted during the year, the number of deaths and the death rate per hundred treated:—

(*The Quarantine Hospital and Leper Settlement are not included*)

Hospitals	Average daily number of patients	Patients Treated			Deaths	Percentage of deaths to total treated
		Male	Female	Total		
General Hospital	354.88	4,229	1,301	5,530	855	12.52
Tan Tock Seng Hospital	561.66	4,817	348	5,165	742	14.36
Kandang Kerbau Hospital	196.00	..	5,684	5,684	91	1.60
Police Hospital	10.32	464	..	464	..	..
Mental Hospital	254.00	454	239	693	90	12.10
Prison Hospital	45.07	889	3	892	3	.34
St. Andrew's Orthopædic Hospital ..	58.00	50	42	92	6	6.52
Social Hygiene Hospital	163.00	361	1,144	1,505	..	..
Middleton Hospital	46.00	754	395	1,149	90	7.83
Total ..	1,688.93	12,018	9,156	21,174	1,877	6.14

APPENDIX XIV

RETURN OF DISEASES AND DEATHS FROM ALL HOSPITALS
FOR THE PERIOD 1ST APRIL TO 31ST DECEMBER, 1946

Diseases	*Remaining at end of 19	Yearly Total		†Total cases treated	‡Remaining at end of 1946	Remarks
		Admissions	Deaths			
I.—*Infectious and Parasitic Diseases*						
1. Typhoid fever		61	12	61	1	
2. Paratyphoid fever ..		9	2	9	..	
3. Typhus:—						
(1) Other than Tropical typhus ..		5	..	5	1	
(2) Tropical typhus 'x 19'(or W or Urban)		17	1	17	..	
(3) Tropical typhus 'K' (or rural), or Tsutsugamushi fever		3	..	3	..	
(4) Other rickettsia infections ..		..	..	..	..	
4. Relapsing fever ..		..	..	..	..	
5. Undulant fever ..		..	..	..	..	
6. Small-pox		98	18	98	17	
7. Measles		200	10	200	1	
8. Scarlet fever		..	..	..	..	
9. Whooping cough ..		40	..	40	1	
10. Diphtheria		128	21	128	11	
11. Influenza		119	1	119	..	
12. Cholera		1	..	1	1	
13. Dysentery:—						
(1) Amœbic ..		133	5	133	6	
(2) Bacillary ..		19	2	19	..	
(3) Mixed		..	..	..	..	
(4) Undefined or due to other causes ..		29	2	29	2	
14. Plague:—						
(1) Bubonic ..		..	..	..	..	
(2) Pneumonic ..		..	..	..	..	
(3) Septicæmic ..		..	..	..	..	
(4) Undefined ..		..	..	..	..	
15. Erysipelas		5	..	5	..	
16. Acute poliomyelitis or polioencephalitis ..		45	2	45	34	
17. Encephalitis lethargica ..		5	2	5	..	
18. Cerebro-spinal fever ..		8	2	8	1	
19. Glanders		..	..	..	..	
20. Anthrax		..	..	..	..	
21. Rabies		..	..	..	..	
22. Tetanus:—						
(1) Tetanus of the newly born ..		47	45	47	1	
(2) Other forms of tetanus ..		35	12	35	..	
Carried forward ..		1,007	137	1,007	77	

The form shows in the main the arrangement of diseases in the *International Nomenclature, 1931 Edition.* To save space the unimportant diseases of any class can be grouped in their places as "Other Diseases" of the Class.

* *i.e.* the year previous to that for which the return is made.

† "Total cases treated" will, of course, include those remaining in Hospital at the end of the previous year.

‡ The figures in this column to be carried on to the next year's Return.

APPENDIX XIV—*continued*

RETURN OF DISEASES AND DEATHS FROM ALL HOSPITALS—*continued*

Diseases	*Remaining at end of 19	YEARLY TOTAL		†Total cases treated	‡Remaining at end of 1946	Remarks
		Admissions	Deaths			
Brought forward ..		1,007	137	1,007	77	
I.—*Infectious and Parasitic Diseases*—(contd.)						
23. Tuberculosis of the respiratory system		1,140	389	1,140	232	
24. Tuberculosis of the central nervous system ..		51	46	51	..	
25. Tuberculosis of the intestines or peritoneum ..		20	7	20	1	
26. Tuberculosis of the vertebral column		47	12	47	19	
27. Tuberculosis of other bones and joints		69	2	69	30	
28. Tuberculosis of the skin or subcutaneous tissue(Lupus)		..	..	..	..	
29. Tuberculosis of the lymphatic system .. .. (abdominal and bronchial excepted)		13	5	13	..	
30. Tuberculosis of the genito-urinary system ..		4	1	4	..	
31. Tuberculosis of other organs		7	5	7	..	
32. Tuberculosis disseminated ..		35	19	35	..	
33. Leprosy		432	20	432	337	
34. Syphilis (also *see* 35 (7)):—						
(1) Primary ..						
(2) Secondary ..						
(3) Tertiary ..						
(4) Hereditary ..						
(5) Period not indicated						
35. Other venereal diseases:—						
(1) Soft chancre ..						
(2) Gonorrhœa ..						
(3) Gonorrhœal ophthalmia	V.D	1,763	19	1,763	59	
(4) Other gonorrhœal complications ..						
(5) Granuloma venereum ..						
(6) Tropical bubo (Lympho-granuloma inguinale) ..						
(7) Mixed venereal infections ..						
Carried forward ..		4,588	662	4,588	755	

APPENDIX XIV—*continued*

RETURN OF DISEASES AND DEATHS FROM ALL HOSPITALS—*continued*

Diseases	*Remaining at end of 19	YEARLY TOTAL		†Total cases treated	‡Remaining at end of 1946	Remarks
		Admissions	Deaths			
Brought forward ..		4,588	662	4,588	755	
I.—*Infectious and Parasitic Diseases*—(contd.)						
36. Purulent infective septicæmia or Pyæmia		7	5	7	..	
37. Yellow fever		..	..	..	..	
38. Malaria:—						
(1) Tertian (Benign) ..		74	..	74	1	
(2) Quartan ..		2	..	2	..	
(3) Aestivo-autumnal .. (Subtertian)		184	50	184	8	
(4) Mixed infections ..		14	2	14	..	
(5) Unclassified ..		380	17	380	5	
(6) Cachexia ..		..	..	..	..	
(7) Blackwater fever ..		..	..	..	..	
39. Other diseases due to Protozoa:—						
(1) Yaws (frambœsia) ..		1	..	1	..	
(2) Spirochætosis icterohæmorrhagica ..		..	..	..	..	
(3) Leishmaniasis (dermal) ..		..	..	..	..	
(4) Kala azar ..		..	..	..	..	
(5) Other diseases ..		3	..	3	..	
40. *See* 42 (6)		..	..	..	..	
41. *See* 42 (3)		..	..	..	..	
42. Other diseases due to Helminths:—						
Cestodes						
(1) Tænia solium ..		..	..	..	..	
(2) Tænia saginata ..		..	..	..	..	
(3) Other cestodes, including hydatid cyst		..	..	..	..	
Nematodes						
(4) Filaria ..		6	..	6	..	
(5) Ascaris ..		85	1	85	1	
(6) Ankylostoma ..		59	5	59	3	
(7) Oxyuris vermicularis		..	..	..	..	
(8) Dracunculus medinensis ..		..	..	..	..	
Carried forward ..		5,403	742	5,403	773	

APPENDIX XIV—*continued*

RETURN OF DISEASES AND DEATHS FROM ALL HOSPITALS—*continued*

Diseases	*Remaining at end of 19	YEARLY TOTAL		†Total cases treated	‡Remaining at end of 1946	Remarks
		Admissions	Deaths			
Brought forward ..		5,403	742	5,403	773	
I.—*Infectious and Parasitic Diseases*—(contd.)						
42.—Other diseases due to Helminths:—(contd.)						
Trematodes						
(9) Schistosomum japonicum ..		..	..	..	..	
(10) Clonorchis sinensis ..		..	..	..	..	
(11) Other helminths ..		1	..	1	..	
43.—(1) Sprue		..	..	..	..	
(2) Actinomycosis ..		..	..	..	..	
(3) Other mycotic infections excluding purely dermal mycosis ..		14	..	14	..	
44. Other infectious or parasitic diseases:—						
(1) Vaccinia including post vaccinal encephalitis ..		..	..	..	..	
(2) Other sequelæ of vaccination ..		..	..	..	..	
(3) Rubella ..		..	..	..	..	
(4) Varicella (chickenpox) ..		175	..	175	7	
(5) Mumps and its complications ..		38	..	38	5	
(6) Dengue ..		14	..	14	..	
(7) Melioidosis ..		..	..	..	..	
(8) Myiasis ..		..	..	..	..	
(9) Glandular fever ..		..	..	..	..	
(10) Others ..		..	..	..	..	
II.—*Cancer and other Tumours*						
45. Cancer or other malignant diseases of the buccal cavity, and pharynx and œsophagus		20	9	20	..	
Carried forward ..		5,665	751	5,665	785	

APPENDIX XIV—*continued*

RETURN OF DISEASES AND DEATHS FROM ALL HOSPITALS—*continued*

Diseases	*Remaining at end of 19	YEARLY TOTAL		†Total cases treated	‡Remaining at end of 1946	Remarks
		Admissions	Deaths			
Brought forward ..		5,665	751	5,665	785	
II.—*Cancer and other Tumours* —(contd.)						
46. Cancer or other malignant tumours of the digestive organs and peritoneum:—						
(1) Stomach ..		23	13	23	1	
(2) Liver		32	18	32	..	
(3) Other digestive organs ..		19	2	19	4	
47. Cancer or other malignant tumours of the respiratory organs		6	3	6	..	
48. Cancer or other malignant tumours of the uterus ..		4	1	4	..	
49. Cancer or other malignant tumours of other female genital organs ..		1	..	1	..	
50. Cancer or other malignant tumours of the breast ..		9	..	9	..	
51. Cancer or other malignant tumours of the male genito-urinary organs ..		9	4	9	2	
52. Cancer or other malignant tumours of the skin ..		14	..	14	1	
53. Cancer or other malignant tumour of organs not specified		36	4	36	4	
54. Tumours non-malignant:—						
(1) Of female genital organs ..		12	..	12	..	
(2) Of other sites ..		22	2	22	..	
55. Tumours of undetermined nature:—						
(1) Female genital organs ..		3	..	3	..	
(2) Other sites ..		32	7	32	3	
Carried forward ..		5,887	805	5,887	800	

APPENDIX XIV—*continued*

RETURN OF DISEASES AND DEATHS FROM ALL HOSPITALS—*continued*

Diseases	*Remaining at end of 19	YEARLY TOTAL		†Total cases treated	‡Remaining at end of 1946	Remarks
		Admissions	Deaths			
Brought forward ..		5,887	805	5,887	800	
III.—*Rheumatism, Diseases of Nutrition and of Endocrine Glands and other General Diseases*						
56. Rheumatic Fever:—						
(1) With cardiac involvment ..		5	1	5	..	
(2) Without cardiac involvment ..		19	1	19	2	
57. Rheumatism and Arthritis (non-suppurative) ..		35	3	35	..	
58. Gout		..	..	..	..	
59. Diabetes (not including diabetes insipidus) ..		37	2	37	1	
60. Scurvy (including Barlow's disease)		..	..	..	..	
61.—(1) Beri-beri including epidemic dropsy ..		80	26	80	..	
(2) Beri-beri associated with pregnancy or labour		..	..	..	..	
62. Pellagra		2	..	2	1	
63. Rickets		1	..	1	..	
64. Other diseases due to hypovitaminosis		15	..	15	..	
65. Diseases of the pituitary gland		..	..	..	..	
66. Diseases of the thyroid and parathyroid glands:—						
(1) Simple goitre ..		3	..	3	..	
(2) Exophthalmic goitre		12	1	12	2	
(3) Myxœdema, cretinism ..		3	..	3	2	
(4) Tetany ..		1	..	1	..	
(5) Others ..		5	..	5	1	
67. Diseases of the thymus ..		1	..	1	..	
68. Diseases of the adrenal glands (excluding tuberculosis) ..		..	..	..	..	
69. Other diseases of metabolism, etc.		26	..	26	..	
Carried forward ..		6,132	839	6,132	809	

APPENDIX XIV—*continued*

RETURN OF DISEASES AND DEATHS FROM ALL HOSPITALS—*continued*

Diseases	*Remaining at end of 19	Yearly Total		†Total cases treated	‡Remaining at end of 1946	Remarks
		Admissions	Deaths			
Brought forward ..		6,132	839	6,132	809	
IV.—*Diseases of the Blood and Blood Forming Organs*						
70. Hæmorrhagic conditions:—						
(1) Purpura ..		5	1	5	1	
(2) Hæmophilia ..		1	..	1	..	
71. Anæmia and chlorosis:—						
(1) Pernicious anæmia ..		3	..	3	..	
(2) Splenic anæmia ..		7	1	7	..	
(3) Chlorosis ..		..	..	..	..	
(4) Secondary anæmia ..		97	29	97	9	
(5) Tropical macrocytic anæmia ..		32	5	32	2	
(6) Others ..		18	6	18	..	
72. Leukæmia:—						
(1) Leukæmia ..		3	..	3	1	
(2) Hodgkin's disease ..		1	..	1	..	
73. Diseases of the spleen not elsewhere mentioned ..		..	..	..	..	
74. Other diseases of the blood and blood forming organs		1	..	1	..	
V.—*Chronic Poisoning*						
75. Alcoholism (acute or chronic) including inebriety ..		27	..	27	..	
76. Poisoning by other organic substances (not by violence):—						
(1) Opium ..		5	..	5	..	
(2) Morphia, cocaine ..		..	..	..	..	
(3) Others ..		1	..	1	..	
77. Poisoning by mineral substances (not by violence):—						
(1) Lead		..	..	..	..	
(2) Arsenic ..		10	1	10	1	
(3) Others ..		7	1	7	..	
VI.—*Diseases of the Nervous System and Sense Organs*						
78. Encephalitis (not including encephalitis lethargical):—						
(1) Cerebral abscess ..		13	9	13	1	
(2) Other forms of encephalitis ..		15	6	15	..	
Carried forward ..		6,378	898	6,378	824	

APPENDIX XIV—*continued*

RETURN OF DISEASES AND DEATHS FROM ALL HOSPITALS—*continued*

Diseases	*Remaining at end of 19	YEARLY TOTAL		†Total cases treated	‡Remaining at end of 1946	Remarks
		Admissions	Deaths			
Brought forward ..		6,378	898	6,378	824	
VI.—*Diseases of the Nervous System and Sense Organs* —(contd.)						
79. Meningitis (not including tuberculous meningitis or cerebro-spinal meningitis)		39	20	39	3	
80. Tabes dorsalis (Locomotor ataxia)		5	1	5	..	
81. Other diseases of the spinal cord		4	1	4	1	
82. Cerebral vascular accidents..		89	29	89	2	
83. General paralysis of the insane		3	1	3	1	
84. Other forms of insanity, *i.e.* not 83, 150 (1), 162 (1) or 203		710	90	710	383	
85. Epilepsy		16	1	16	1	
86. Infantile convulsions (age under 5 years) ..		7	3	7	..	
87. Other diseases of the nervous system:—						
(1) Chorea ..		..	..	..	..	
(2) Neuritis and neuralgia		14	..	14	2	
(3) Paralysis agitans ..		27	2	27	17	
(4) Disseminated sclerosis		..	..	..	..	
(5) Neurasthenia ..		3	..	3	1	
(6) Hysteria ..		7	..	7	1	
(7) Others ..		17	1	17	..	
88. Diseases of the eye:—						
(1) Conjunctivitis ..		14	..	14	..	
(2) Trachoma ..		15	..	15	4	
(3) Corneal ulcer ..		18	..	18	1	
(4) Cataract ..		167	..	167	16	
(5) Others ..		277	1	277	34	
89. Diseases of the ear and/or the mastoid sinus:—						
(1) Otitis externa ..		8	..	8	..	
(2) Otitis media and its complications ..		30	..	30	1	
(3) Others ..		21	1	21	..	
Carried forward ..		7,869	1,049	7,869	1,292	

APPENDIX XIV—*continued*

RETURN OF DISEASES AND DEATHS FROM ALL HOSPITALS—*continued*

Diseases	*Remaining at end of 19	Yearly Total		†Total cases treated	‡Remaining at end of 1946	Remarks
		Admissions	Deaths			
Brought forward ..		7,869	1,049	7,869	1,292	
VII.—*Diseases of the Circulatory System*						
90. Pericarditis		5	2	5	..	
91. Acute endocarditis:—						
(1) Malignant ..		2	2	2	..	
(2) Others (not included elsewhere) ..		4	3	4	..	
92. Chronic endocarditis: valvular disease (except due to specific cause elsewhere stated)		44	15	44	..	
93. Diseases of the myocardium (except due to specific cause elsewhere stated) ..		15	7	15	..	
94. Diseases of the coronary arteries (including Angina pectoris)		13	5	13	..	
95. Other diseases of the heart (unless due to specific cause elsewhere stated):—						
(1) Auricular fibrillation		9	1	9	..	
(2) Heart block ..		14	3	14	3	
(3) Others ..		49	17	49	4	
96. Aneurysm (unless due to specific causo elsewhere stated):—						
(1) Aneurysm of aorta..		3	..	3	1	
(2) Aneurysm of other arteries ..		5	..	5	..	
97. Arterio-sclerosis (other than (82), etc.)		12	6	12	..	
98. Gangrene		25	5	25	3	
99. Other diseases of the arteries		4	..	4	..	
100. Diseases of the veins:—						
(1) Varicose veins ..		6	..	6	1	
(2) Hæmorrhoids ..		69	..	69	5	
(3) Phlebitis ..		2	..	2	..	
(4) Thrombosis ..		3	1	3	..	
(5) Others ..		1	..	1	..	
101. Diseases of the lymphatic system:—						
(1) Lymphangitis ..		6	..	6	1	
(2) Lymphadenitis ..		11	..	11	..	
(3) Bubo (non-specified)		30	..	30	1	
102. Abnormalities of blood pressure:—						
(1) High blood pressure		87	26	87	2	
(2) Low blood pressure		..	..	..	..	
Carried forward ..		8,288	1,142	8,288	1,313	

APPENDIX XIV—*continued*

RETURN OF DISEASES AND DEATHS FROM ALL HOSPITALS—*continued*

Diseases	*Remaining at end of 19	Yearly Total		†Total cases treated	‡Remaining at end of 1946	Remarks
		Admissions	Deaths			
Brought forward ..		8,288	1,142	8,288	1,313	
VII.—*Diseases of the Circulatory System*—(contd.)						
103. Other diseases of the Circulatory system:—						
(1) Epistaxis ..		2	..	2	..	
(2) Others (including unexplained hæmorrhages) ..		2	1	2	..	
VIII.—*Diseases of the Respiratory System*						
104. Diseases of the nasal fossæ and its annexa:—						
(1) Diseases of the nose		22	..	22	..	
(2) Diseases of the accessory nasal sinuses		60	..	60	1	
105. Diseases of the larynx:—						
(1) Laryngismus stridulus ..		..	..	..	..	
(2) Laryngitis (acute or chronic, of non-specific etiology)		10	..	10	..	
(3) Other diseases of the larynx ..		..	..	..	..	
106. Bronchitis:—						
(1) Acute		43	1	43	..	
(2) Chronic ..		61	14	61	..	
(3) Not defined as acute or chronic ..		40	..	40	3	
107. Broncho-pneumonia ..		153	91	153	10	
108. Lobar-pneumonia ..		351	62	351	8	
109. Pneumonia (not otherwise defined)		111	10	111	5	
110. Pleurisy:—						
(1) Empyema ..		36	9	36	7	
(2) Other pleurisy ..		63	2	63	8	
111. Congestion and hæmorrhagic infarction of lung, etc:—						
(1) Hypostatic congestion of lung ..		1	1	1	..	
(2) Massive collapse ..		..	..	..	..	
(3) Pulmonary embolism		..	..	..	..	
(4) Others ..		9	1	9	..	
112. Asthma		69	..	69	2	
113. Pulmonary emphysema ..		15	6	15	1	
Carried forward ..		9,336	1,340	9,336	1,358	

APPENDIX XIV—*continued*

RETURN OF DISEASES AND DEATHS FROM ALL HOSPITALS—*continued*

Diseases	*Remaining at end of 19	Yearly Total		†Total cases treated	‡Remaining at end of 1946	Remarks
		Admissions	Deaths			
Brought forward ..		9,336	1,340	9,336	1,358	
VIII.—*Diseases of the Respiratory System*—(contd.)						
114. Other diseases of the respiratory system:—						
(1) Chronic interstitial pneumonia (including occupational diseases of the lung) ..		..	..	..	..	
(2) Gangrene of the lung		1	1	1	..	
(3) Abscess of the lung		22	8	22	2	
(4) Bronchiectasis ..		36	..	36	..	
(5) Others ..		15	2	15	2	
IX.—*Diseases of the Digestive System*						
115. Diseases of the buccal cavity, pharynx, etc.:—						
(1) Pyorrhœa and Gingivitis ..		21	..	21	3	
(2) Dental caries ..		24	..	24	..	
(3) Stomatitis ..		4	..	4	..	
(4) Vincent's or Ludwig's Angina ..		11	..	11	..	
(5) Diseases of the tonsils		173	..	173	4	
(6) Others, including coryza, acute nasopharyngitis, etc...		45	..	45	..	
116. Diseases of the œsophagus ..		1	..	1	..	
117. Ulcer of the stomach or duodenum :—						
(1) Ulcer of the stomach		84	12	84	4	
(2) Ulcer of the duodenum ..		15	..	15	1	
118. Other diseases of the stomach:—						
(1) Gastritis ..		79	1	79	..	
(2) Others, *e.g.* indigestion		31	2	31	..	
119. Diarrhœa and enteritis .. (under 2 years)		129	67	129	4	
Carried forward ..		10,027	1,433	10,027	1,378	

APPENDIX XIV—*continued*

RETURN OF DISEASES AND DEATHS FROM ALL HOSPITALS—*continued*

Diseases	*Remaining at end of 19	YEARLY TOTAL		†Total cases treated	‡Remaining at end of 1946	Remarks
		Admissions	Deaths			
Brought forward ..		10,027	1,433	10,027	1,378	
IX.—*Diseases of the Digestive System*—(contd.)						
120. Diarrhœa and enteritis:— (2 years and over)						
(1) Colitis		17	..	17	1	
(2) Otherwise defined, including gastro-enteritis ..		213	7	213	3	
121. Appendicitis		197	16	197	6	
122. Hernia, Intestinal obstruction:—						
(1) Hernia ..		131	..	131	5	
(2) Strangulated hernia		34	..	34	2	
(3) Intestinal obstruction .. .. (including intussusception)		14	7	14	2	
123. Other diseases of the intestines:—						
(1) Constipation, intestinal stasis ..		21	..	21	..	
(2) Diseases of Rectum or Anus ..		55	..	55	4	
(3) Others, *e.g.*, intestinal colic ..		80	5	80	5	
124. Cirrhosis of liver (non-syphilitic):—						
(1) Alcoholic ..		1	1	1	..	
(2) Not returned as alcoholic ..		36	17	36	..	
125. Other diseases of the liver:—						
(1) Acute yellow atrophy		3	2	3	..	
(2) Toxic hepatitis ..		32	1	32	3	
(3) Amœbic abscess and hepatitis ..		42	6	42	5	
(4) Others ..		2	1	2	..	
126. Biliary calculi or Biliary colic		14	..	14	1	
127. Other diseases of the gall bladder and ducts:—						
(1) Cholecystitis without record of calculi ..		19	6	19	..	
(2) Others, *e.g.*, catarrhal jaundice ..		18	1	18	..	
Carried forward ..		10,956	1,503	10,956	1,415	

APPENDIX XIV—*continued*

RETURN OF DISEASES AND DEATHS FROM ALL HOSPITALS—*continued*

Diseases	*Remaining at end of 19.	YEARLY TOTAL		†Total cases treated	‡Remaining at end of 1946	Remarks
		Admissions	Deaths			
Brought forward ..		10,956	1,503	10,956	1,415	
IX.—*Diseases of the Digestive System*—(contd.)						
128. Diseases of the pancreas (excluding diabetes mellitus) ..		2	1	2	..	
129. Peritonitis, without stated cause:—						
(1) Acute		22	8	22	2	
(2) Chronic ..		4	3	4	1	
X.—*Diseases of the Genito-Urinary System* (*non-venereal*)						
130. Acute nephritis		65	16	65	8	
131. Chronic nephritis ..		18	9	18	..	
132. Nephritis (undefined as acute or chronic)		21	4	21	3	
133. Other diseases of the kidney and annexa:—						
(1) Pyelitis ..		28	1	28	..	
(2) Others ..		11	3	11	..	
134. Calculi of the urinary passages:—						
(1) Calculi of the kidney and ureter, or renal colic ..		57	..	57	2	
(2) Calculi of the bladder or urethra ..		24	..	24	3	
(3) Calculi of unstated site		..	..	..	..	
135. Diseases of the Bladder:—						
(1) Cystitis ..		18	2	18	..	
(2) Others ..		8	..	8	1	
136. Diseases of the urethra:—						
(1) Stricture ..		28	2	28	3	
(2) Others ..		18	2	18	..	
137. Diseases of the prostate ..		6	1	6	1	
138. Diseases of the male genital organs:—						
(1) Epididymitis ..		4	..	4	..	
(2) Orchitis ..		9	..	9	..	
(3) Hydrocele ..		68	..	68	7	
(4) Others, *e.g.*, phimosis		31	..	31	1	
Carried forward ..		11,398	1,555	11,398	1,447	

APPENDIX XIV—*continued*

RETURN OF DISEASES AND DEATHS FROM ALL HOSPITALS—*continued*

Diseases	*Remaining at end of 19	YEARLY TOTAL		†Total cases treated	‡Remaining at end of 1946	Remarks
		Admissions	Deaths			
Brought forward ..		11,398	1,555	11,398	1,447	
X.—*Diseases of the Genito-Urinary System (non-venereal)*—(contd.)						
139. Diseases of the female genital organs:—						
(1) Diseases of the ovary		46	10	46	4	
(2) Diseases of the fallopian tube ..		87	3	87	7	
(3) Diseases of the parametrium ..		11	..	11	1	
(4) Diseases of the uterus, including menorrhagia and dysmenorrhœa ..		125	4	125	9	
(5) Diseases of the breast		19	..	19	2	
(6) Other diseases of the female genital organs, *e.g.*, prolapse ..		117	9	117	15	
XI.—*Conditions arising in Pregnancy, Childbirth and the Puerperal State*						
140. Post abortive sepsis ..		90	5	90	4	
141. Abortion not returned as septic		211	4	211	6	
142. Ectopic gestation ..		36	6	36	1	
143. Other accidents of pregnancy		3	..	3	..	
144. Hæmorrhage connected with childbirth:—						
(1) Placenta prævia ..		54	6	54	2	
(2) Others ..		155	..	155	8	
145. Puerperal sepsis:—						
(1) Puerperal septicæmia		52	3	52	1	
(2) Puerperal sepsis, not including septicæmia		418	7	418	7	
146. Abuminuria and convulsions connected with pregnant state:—						
(1) Ante-partum eclampsia ..		47	6	47	2	
(2) Intra-partum eclampsia ..		..	..	..	..	
(3) Post-partum eclampsia ..		2	..	2	..	
Carried forward ..		12,871	1,618	12,871	1,516	

APPENDIX XIV—*continued*

RETURN OF DISEASES AND DEATHS FROM ALL HOSPITALS—*continued*

Diseases	*Remaining at end of 19	YEARLY TOTAL		†Total cases treated	‡Remaining at end of 1946	Remarks
		Admissions	Deaths			
Brought forward ..		12,871	1,618	12,871	1,516	
XI.—*Conditions arising in Pregnancy, Childbirth and the Puerperal State*—(contd.)						
146. *Abuminuria and convulsions connected with pregnant state:* —(contd.)						
(4) Albuminuria of pregnancy ..		568	1	568	14	
(5) Pyelitis of pregnancy		32	..	32	1	
(6) Otherwise defined ..		..	..	..	..	
147. Other Toxæmias of pregnancy:—						
(1) Hyperemesis gravidarum ..		36	..	36	..	
(2) Others ..		..	..	..	..	
148. Puerperal phlegmasia or embolism:—						
(1) Puerperal phlegmasia		4	..	4	..	
(2) Puerperal embolism		2	..	2	..	
149. Conditions associated with Labour:—						
(1) Normal labour ..		4,327	..	4,327	152	
(2) Abnormal labour, *e.g* needing instrumental interference ..		384	12	384	13	
(3) Labour complicated with intercurrent disease ..		2,000	17	2,000	84	
(4) Accidents of childbirth ..		482	3	482	19	
150. Other or unspecified conditions of the puerperal state:—						
(1) Puerperal insanity..		5	1	5	..	
(2) Puerperal disease of the breast ..		12	..	12	..	
(3) Others ..		..	..	..	..	
XII.—*Diseases of the Skin and Cellular Tissues*						
151. Carbuncle, boil ..		60	3	60	..	
152. Cellulitis, or abscess (except due to cause given elsewhere)		344	8	344	18	
Carried forward ..		21,127	1,663	21,127	1,817	

APPENDIX XIV—*continued*

RETURN OF DISEASES AND DEATHS FROM ALL HOSPITALS—*continued*

Diseases	*Remaining at end of 19	YEARLY TOTAL		†Total cases treated	‡Remaining at end of 1946	Remarks
		Admissions	Deaths			
Brought forward ..		21,127	1,663	21,127	1,817	
XII.—*Diseases of the Skin and Cellular Tissues*—(contd.)						
153. Other diseases of the skin, hair and nails:—						
(1) Ulcers		444	6	444	43	
(2) Dermal mycoses ..		10	..	10	..	
(3) Herpes, including Zoster ..		11	..	11	1	
(4) Scabies ..		58	..	58	1	
(5) Others ..		158	..	158	9	
XIII.—*Diseases of the Bones and Organs of Locomotion*						
154. Acute or chronic infective osteomyelitis and periostitis, except due to cause given elsewhere ..		52	2	52	2	
155. Other diseases of the bones ..		9	1	9	..	
156. Diseases of the joints and other organs of locomotion:—						
(1) Diseases of the joints (other than stated elsewhere) ..		39	1	39	3	
(2) Diseases of the other organs of locomotion ..		16	1	16	2	
XIV.—*Congenital Malformations*						
157. Congenital malformations:—						
(1) Congenital hydrocephalus ..		1	..	1	..	
(2) Spina bifida and meningocele ..		1	..	1	1	
(3) Congenital malformation of the heart		3	..	3	..	
(4) Monstrosities ..		1	..	1	..	
(5) Congential hypertrophic pyloric stenosis ..		..	..	..	..	
(6) Cleft palate, harelip		9	..	9	..	
(7) Imperforate anus ..		3	2	3	..	
(8) Other congenital malformations ..		8	1	8	..	
Carried forward ..		21,950	1,677	21,950	1,879	

APPENDIX XIV—*continued*

RETURN OF DISEASES AND DEATHS FROM ALL HOSPITALS—*continued*

Diseases	*Remaining at end of 19	YEARLY TOTAL		†Total cases treated	‡Remaining at end of 1946	Remarks
		Admissions	Deaths			
Brought forward ..		21,950	1,677	21,950	1,879	
XV.—*Diseases of early Infancy*						
158. Congenital debility, including marasmus of unknown cause		2	2	2	..	
159. Premature birth ..		635	4	635	..	
160. Injury at birth ..		..	..	..	..	
161. Other diseases peculiar to early infancy:—						
(1) Atelectasis pulmonum ..		..	..	..	..	
(2) Icterus neonatorum						
(*a*) Mild ..		..	..	..	..	
(*b*) Grave ..		2	2	2	..	
(3) Affections of the umbilicus ..		2	2	2	..	
(4) Pemphigus neonatorum ..		1	..	1	..	
(5) Others ..		3	2	3	..	
XVI.—*Conditions Associated with Old Age*						
162.—(1) Senile dementia ..		7	4	7	..	
(2) Other forms of senile decay		4	..	4	..	
XVII.—*Affections Produced by External Causes*						
163. Suicide, or attempted suicide, by poisoning .. .. (including corrosive poisoning)		32	14	32	..	
164. Suicide, or attempted suicide, by gas poisoning ..		..	..	..	..	
165. Suicide, or attempted suicide, by hanging or strangulation		..	..	..	..	
166. Suicide, or attempted suicide, by drowning ..		2	..	2	..	
167. Suicide, or attempted suicide, by firearms		..	..	..	..	
168. Suicide, or attempted suicide, by cutting or piercing instruments		38	4	38	1	
Carried forward ..		22,678	1,711	22,678	1,880	

APPENDIX XIV—*continued*

RETURN OF DISEASES AND DEATHS FROM ALL HOSPITALS—*continued*

Diseases	*Remaining at end of 19	YEARLY TOTAL		†Total cases treated	‡Remaining at end of 1946	Remarks
		Admissions	Deaths			
Brought forward ..		22,678	1,711	22,678	1,880	
XVII.—*Affections Produced by External Causes*—(contd.)						
169. Suicide, or attempted suicide, by jumping from a height		2	..	2	..	
170. Suicide, or attempted suicide, by crushing		..	..	..	..	
171. Suicide, or attempted suicide, by other means ..		..	..	..	..	
172. Infanticide		..	..	..	..	
173. Assault or homicide, by fire-arms		51	8	51	5	
174. Assault or homicide, by cutting or piercing instruments		70	3	70	2	
175. Assault or homicide, by other means		172	4	172	7	
176. Attacks by venomous animals:—						
(1) Snake bite ..		..	..	..	..	
(2) Insect bite ..		2	..	2	..	
(3) Others ..		11	..	11	..	
177. Food poisoning ..		12	..	12	..	
178. Accidental absorption of irrespirable or poisonous gas		1	..	1	..	
179. Other acute accidental poisoning		10	1	10	2	
180. Injuries due to conflagration		..	..	..	..	
181. Accidental burns:— (Conflagration excepted)						
(1) Burns by fire ..		255	39	255	12	
(2) Scalds		80	1	80	3	
(3) Burns by corrosive substances, external or internal ..		6	1	6	..	
(4) Dermatitis due to exposure to sun ..		..	..	..	..	
(5) Dermatitis due to exposure to other forms of radiation		..	..	..	..	
182. Accidental mechanical suffocation		..	..	..	..	
183. Accidental immersion or drowning		4	..	4	..	
184. Accidental injury by firearms		23	6	23	..	
185. Accidental injury by cutting or piercing instruments ..		246	..	246	12	
186. Accidental injury by fall, crushing, etc:—						
(1) By fall ..		361	29	361	41	
(2) By machinery ..		21	..	21	1	
Carried forward ..		24,005	1,803	24,005	1,965	

APPENDIX XIV—*continued*

RETURN OF DISEASES AND DEATHS FROM ALL HOSPITALS—*continued*

Diseases	*Remaining at end of 19	YEARLY TOTAL		†Total cases treated	‡Remaining at end of 1946	Remarks
		Admissions	Deaths			
Brought forward ..		24,005	1,803	24,005	1,965	
XVII.—*Affections Produced by External Causes*—(contd.)						
186. *Accidental injury by fall, crushing, etc.*:—(contd.)						
(3) By motor vehicles ..		695	63	695	52	
(4) By railway vehicles		1	1	1	..	
(5) By other means ..		448	15	448	19	
187. Cataclysm:— (tidal waves, cyclones, etc.)						
188. Injury by animals (except bites or stings of venomous reptiles or insects) ..		..	..	..	..	
189. Hunger or thirst ..		..	..	..	..	
190. Excessive cold ..		..	..	..	..	
191. Excessive heat		1	..	1	..	
192. Lightning		..	..	..	..	
193. Electricity		2	..	2	..	
194. Other unstated forms of violence:—						
(1) Inattention at birth		..	..	..	..	
(2) Others, *e.g.*, foreign body swallowed ..		10	..	10	..	
195. Violence of an unstated nature (*i.e.* suicidal, homicidal, or accidental, by poisoning or any other means)		44	2	44	2	
196. Wounds or other injuries of War		11	1	11	1	
197. Execution of civilians by belligerent armies ..		..	..	..	..	
198. Execution		5	5	5	..	
XVIII.—*Ill-defined Conditions*						
199. Sudden illness (cause unknown)		30	..	30	..	
200. Cause of illness unstated or ill-defined		229	8	229	31	
201. Diseases not included in this classification elsewhere which have caused no deaths		43	..	43	..	
202. Malingering		..	..	..	..	
203. Cases admitted to hospital for observation as to mental condition		219	..	219	..	
204. Cases admitted for observation .. .. (not mental)		114	..	114	7	
205. Persons accompanying patients		145	..	145	5	
Total ..		26,002	1,898	26,002	2,082	

APPENDIX XV

The gynæcological admissions were classified as follows:—

Papilloma	3
Cyst	41
Malignant Tumour	1
Salpingitis	46
Tubal Pregnancy	31
Parametritis	1
Pelvic Cellulitis	5
Pelvic Abscess	2
Endometritis	22
Fibroids	20
Carcinoma of Uterus	1
Dysmenorrhoea	15
Menorrhagia	51
Metrorrhagia	10
Endocervicitis	5
Cervical Erosion	7
Polyp	11
Carcinoma of Cervix	17
Prolapse	9
Procidentia	11
Vaginitis	2
Vaginal Prolapse	10
Fistulæ	13
Vulvo-Vaginitis	10
Bartholins Cyst	1
Urethral Caruncle	4
Perineal Tears	7
Retroverted Uterus	12
Hyperemesis	15
Toxæmia of Pregnancy	12
Hydatidiform Mole	17
Sterility	259
Abortion	298
Others	241
Ex-Uterine Pregnancy	1
Chorion Epithelioma	2
Ruptured Uterus	1
Retroverted Gravid Uterus	2
Total	**1,216**

APPENDIX XVI

Below is a classification of gynæcological deaths:—

Toxæmia and Melanoma	1
Malignant Ovarian Cyst	6
Ruptured Dermoid Ovarian Cyst	1
Papilloma Ovary—Intestinal Obstruction ..	1
Papilliferous Cystic Adenoma + Uræmia ..	1
Tubo-Ovarian Abscess, Laparotomy, Peritonitis ..	1
Pyosalpynx, Peritonitis, Laparotomy ..	1
Sarcoma of Uterus + Post Operative Collapse ..	1
Tetanus following Abortion	2
Uterine Fibromyoma + Chronic Nephritis ..	1
Retroverted Gravid Uterus + Acute Cystitis ..	1
Carcinoma of Cervix	1
Puerperal Septicæmia + Cardiac Failure ..	1
Paralytic Ileus following Cæsarean Section ..	1
Paralytic Ileus following Carcinoma of Cervix ..	1
Paralytic Ileus following Retroverted Uterus ..	1
Cardiac Beri-beri + Anæmia + Abortion ..	1
Cardiac Beri-beri + Septic Abortion	1
Ruptured Tubal Pregnancy	2
Vesicular Mole + Shock and Hæmorrhage ..	1
Abortion + Malaria	1
Abortion + Hemiplegia	1
Abortion + Pulmonary Tuberculosis	1
Pregnancy, Septic, Abortion Hæmorrhage ..	1
Pregnancy, Thrombo-Phlebitis	1
Pregnancy, Rheumatic Endocarditis	1
Cerebral Hæmorrhage 20 days P.P.	1
Pelvic Cellulitis	1
Abortion + Typhoid	1
Abortion + Cerebral Malaria	1
Total ..	37

APPENDIX XVII

The main diseases complicating pregnancy, together with the number of cases, were as follows:—

Malaria	72
Beri-beri	16
Severe Anæmia (Hb. less than 25%, less 2M) ..	21
Helminthiasis	692
Albuminuria	1,576
Syphilis	49
Probably Syphilis (Kahn doubtful; history and signs suggestive)	15
Possibly Syphilis (Kahn negative; history and signs suggestive)	92
Total ..	2,533

APPENDIX XVIII

Below is a classification of abnormal deliveries:—

Breech	185
Face	9
P. O. P.	17
Twins	45
Triplets	1
Transverse	19
Brow	1
Accidental Hæmorrhage	27
Unavoidable Hæmorrhage	41
Eclampsia	37
Albuminuria, including toxæmia	450
P. P. H.	89
Hydramnios	14
Retained Placenta	57
Ruptured Uterus	3
Prolapse Cord	5
Abortions and Miscarriages	34
Total	1,034

APPENDIX XIX

The classification of obstetric deaths was as follows:—

Pre-existing Disease

Acute Beri-beri	3
Malaria	1
Cerebral Malaria	2
Severe Anæmia	5
Pulmonary Tuberculosis	3
Lung Abscess	1
Mitral Endocarditis	1
Cerebral Hæmorrhage	2
Total	18

Purely Obstetrical

Eclampsia	6
Toxæmia	1
Placenta Previa	6
Accidental Hæmorrhage	3
Retained Placenta and P.P.H.	5
Obstetric Shock—Prolonged Labour	5
Hydatidiform Mole	2
Total	28

The above deaths represent 1.05% of total deliveries.

APPENDIX XX

The following is a summary of the work done by the Dental Department during the nine months under review:—

EXTRACTIONS

Anæsthetic	*Nitrous Oxide*	*Other General Anæsthetic*	*Local and Regional Anæsthetic*	*Total*
Patients	339	66	4,501	4,906
Teeth	1,018	174	7,029	8,221

Fillings	*Scalings*	*Dressings*	*Dentures Supplied*
2,077	465	5,747	234

APPENDIX XXI

The classification of nationalities is as follows:—

	Chinese	*Indian*	*Malay*	*Others*	*Total*
Adults*	1,100	555	394	290	2,339
Children	782	124	57	73	1,036
Total ..	1,882	679	451	363	3,375

* A patient over 15 years of age is grouped with the adults.

APPENDIX XXII

The following table shows the total number of new cases and the varying types of venereal disease treated at Government centres during period under review:—

Disease	*Male*	*Female*	*Total*
Syphilis	2,405	419	2,824
Gonorrhœa	1,501	303	1,804
Chancroid	1,067	1	1,068
Lympho-Granuloma Inguinale ..	9	..	9
Ulcerative Granuloma	2	..	2
Ophthalmia Neonatorum	..	8	8
Gonococcal Conjunctivitis	..	2	2
Combined infection	..	235	235
Non-V. D.	..	299	299
Total ..	4,984	1,267	6,251

APPENDIX XXII—(*a*)

The following table shows the various drugs used and the number of cases treated:—

Penicillin	1,699	cases
Sulphathiazole	2,262	,,
Arsenic and Bismuth	2,405	,,
M. and B. 760 Tablets	210	,,
M. and B. 693 Tablets	169	,,
Sulphonamide	476	,,
Antimony	9	,,
Total ..	7,230	,,

APPENDIX XXIII

The principal diseases treated in the Prison Hospital during the period under review are classified hereunder:—

Infectious and Parasitic Diseases.	
Paratyphoid Fever	1
Measles	7
Influenza	38
Amœbic Dysentery	7
Bacillary Dysentery	2
Tuberculosis of the respiratory system	23
Leprosy	3
Primary Syphilis	11
Secondary Syphilis	18
Syphilis—period not indicated	1
Soft Chancre	32
Gonorrhœa	57
Other gonorrhœal complications	1
Tropical bubo	1
B.T. Malaria	17
S.T. Malaria	12
Malaria—unclassified	47
Yaws	1
Ascaris	18
Ankylostoma	8
Other helminths	1
Other mycotic infections excluding purely dermal mycosis	14
Chicken-pox	5
Mumps	4
Rheumatism and Diseases of Nutrition.	
Rheumatism, without cardiac involvment ..	3
Diabetes	1
Beri-beri	8
Diseases of the Blood and Blood Forming Organs.	
Pernicious anæmia	2
Splenic anæmia	3
Secondary anæmia	4

APPENDIX XXIII—*continued*

Chronic Poisoning.	
Opium	1
Diseases of the Nervous System and Sense Organs.	
Cerebro-vascular accidents	1
Epilepsy	1
Neuritis and neuralgia	2
Conjunctivitis	7
Trachoma	2
Corneal ulcer	1
Otitis externa	5
Otitis media	6
Diseases of the Circulatory System.	
Diseases of the coronary arteries	1
Hæmorrhoids	8
Others	1
Bubo non-specified	12
Diseases of the Respiratory System.	
Diseases of the accessory nasal sinuses	1
Laryngitis	3
Acute Bronchitis	10
Chronic Bronchitis	16
Broncho-pneumonia	3
Lobar-pneumonia	9
Congestion and hæmorrhagic infarction of lung—others	8
Diseases of the Digestive System.	
Pyorrhœa and Gingivitis	11
Dental caries	6
Diseases of the tonsils	9
Others, including coryza, acute naso-pharyngitis, etc.	6
Ulcer of the stomach or duodenum	2
Gastritis	8
Colitis	2
Gastro-enteritis	28
Hernia	6
Strangulated hernia	2
Constipation	3
Others, intestinal colic	19
Toxic hepatitis	4
Catarrhal jaundice	4
Diseases of the Genito-Urinary System (non-venereal).	
Nephritis	2
Others	1
Cystitis	5
Others	2
Diseases of the urethra—others	2
Orchitis	3
Hydrocele	1
Others	1

APPENDIX XXIII—*continued*

Diseases of the Skin and Cellular Tissues.

Carbuncle, boil, etc.	20
Cellulitis or abscess	39
Ulcers	31
Dermal mycosis	9
Herpes, including Zoster	6
Scabies	36
Others	28

Diseases of the Bones and Organs of Locomotion.

Diseases of the other organs of locomotion	1

Affections produced by External Causes.

Accidental burns	4
Accidental Scalds	19
Accidental injury by fall, crushing, etc.	1
Accidental injury by other means	78
Violence of an unstated nature	18

Ill-defined conditions.

Causes of illness unstated or ill-defined	21
Cases admitted to hospital for observation as to mental condition	4
Cases admitted for observation (not mental)	2
Total number of deaths in Prison Hospital	3
Total number of deaths in other hospitals	2

Causes of Deaths

Pulmonary Tuberculosis	3
Cardiac Failure	1
Epilepsy	1

Corporal Punishment

Rotan	51
Cat o' Nine Tails	11

Enecutoxs

Judicial Hanging	5

APPENDIX XXIV

The following table is a classification of nationalities treated as patients in the Prison Hospital:—

Nationality	*Long Term*	*Short Term*	*Total*
Europeans	29	2	31
Chinese	427	86	513
Indians	169	50	219
Malays	82	10	92
Javanese	21	..	21
Japanese	11	..	11
Eurasians	2	..	2
Others	1	2	3
Total	742	150	892

APPENDIX XXV

The following is a summary of the examinations carried out by the pathological and clinical laboratories, General Hospital, Singapore:—

Autopsies performed	755
Coroner's Cases	588
Partial Post Mortems	27
Histological Sections examined	1,168
Serological tests (blood)	10,361
Serological tests (C.S.F.)	225
Agglutination tests	498
Cultures + Microscopic examination	1,497
Physiological examination of Blood	13,581
Biochemical examination of Blood and Urine	670
Examination of Cerebro-spinal Fluid	544
Examination of Cisternal, Pleural and other Fluids	227
Examination of Gastric Contents	600
Examination of Blood Films	7,788
Examination of Sputa	6,388
Examination of Smears	1,417
Examination of Urine, including microscopic	7,253
Examination of Fæces	5,916
Animal Inoculations	30
Fiedman's Test	14
Medico-legal examinations	5
Total	59,552

APPENDIX XXVI

ANALYSIS OF NUMBERS AND TYPES OF DONORS

Month	*Total No.*	*"O"*	*"A"*	*"B"*	*"AB"*
June	3	2	1	0	0
July	2	1	1	0	0
August	20	13	4	3	0
September	52	31	12	9	0
October	88	48	17	20	3
November	60	39	11	10	0
December	62	32	19	7	4
Total	287	166	65	49	7

Actual number called	322
Donors rejected	35
Number of Civilian donors	112
Number of Service donors	210
Number of Relative donors	9
Total	688

APPENDIX XXVII

ANALYSIS OF DONORS ACCORDING TO NATIONALITIES

Donor Panel		*Donors Bled*	
Europeans	406	Europeans	203
Indians	70	Indians	46
Malays	12	Malays	12
Eurasians	14	Eurasians	9
Chinese	61	Chinese	17
Total ..	563	Total ..	287

An unrecorded number of Service personnel was called and rejected mostly on medical grounds—such as malaria, positive Kahn tests, etc.

APPENDIX XXVIII

The following table shows the daily cost of diet per head for the period June to December, 1946, at the General Hospital, Singapore:—

——	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
1st Class ..	5 10	4 77	4 68	3 97	3 97	3 80	3 66
2nd Class ..	4 59	4 16	4 08	3 46	3 46	3 35	3 19
3rd Class ..	97	88	86	73	73	71	67

APPENDIX XXIX

Distribution of food factors in the Racial Groups per head per day

	Chinese		Malay		Indian	
	Average intake	Intake as % of standard	Average intake	Intake as % of standard	Average intake	Intake as % of standard
Calories	1,858	77	1,605	64	2,271	90
Protein (grams) ..	64	80	66	68	67	87
Calcium (mg.) ..	382	37	309	30	477	46
Iron (mg.)	11.3	100	11	85	12	129
Vitamin A (I.U.) ..	4,398	204	3,310	73	4,542	160
Thiamin (microg.) ..	1,303	66	633	46	1,073	75
Riboflavin (mg.) ..	634	36	565	32	773	43
Niacin (mg.) ..	9.8	82	7.2	57	11.1	85
Ascorbic acid (mg.) ..	85	120	73	62	74	109

APPENDIX XXX

Table II

Average Heights and Weights of 382 School Boys

Age in years	Number of children	February 1946		April 1946		October 1946		Loss or gain in weight Feb-Oct.	Expected gain in weight Feb-Oct.
		Height inches	Weight pounds	Height inches	Weight pounds	Height inches	Weight pounds		
6	16	42.8	40.0	42.8	41.3	43.6	39.8	−0.2 lb.	+3 lb.
7	22	45.1	45.1	45.2	46.3	46.1	43.8	−1.3 lb.	+4 lb.
8	29	45.9	45.4	46.0	47.4	46.6	45.9	+0.5 lb.	+4 lb
9	30	47.3	48.7	47.7	51.3	48.2	48.8	+0.1 lb.	+4 lb.
10	20	50.1	51.9	49.5	54.2	50.5	52.6	+0.7 lb.	+4 lb.
11	51	51.3	58.9	51.9	62.8	52.4	60.0	+0.1 lb.	+4 lb.
12	50	53.4	64.4	53.7	67.8	54.6	67.0	+2.6 lb.	+6 lb.
13	64	54.7	68.6	55.1	71.8	56.1	71.3	+2.7 lb.	+8 lb.
14	55	57.1	78.3	57.4	80.6	58.8	82.2	+3.9 lb.	+8 lb.
15	45	59.3	86.3	59.0	87.6	60.9	88.6	+2.3 lb.	+9 lb.

APPENDIX A

NEW CIVIL GENERAL HOSPITAL—1,000 BEDS

			Cost $
1st Class Wards ..	80 beds	.. .. ..	1,076,179
2nd ,, ,, ..	280 ,,	.. .. ..	1,090,248
3rd ,, ,, ..	640 ,,	.. .. ..	2,113,097
Kitchen and Laundry	.. ..	.. ..	278,208
Administration block including admission, dental, operations, E.N.T. Opthalmic, X-Ray dispensary, lecture rooms and laboratories, clerks' offices, etc.	.. ..	..	750,900
Mortuary, including chapel	.. ..	.. ..	39,650
Pathology and Bacteriology laboratory	.. ..	..	188,350
Equipment for: Kitchen, Laundry, Theatre, E.T.N. Opthalmic (5% building costs)	.. ..	.. ..	14,000
X-Ray equipment (5% building costs)	.. ..	..	25,000
Air Conditioning equipment (10% of wards)	.. ..	..	100,000
Roads equipment 3 miles	.. ..	.. ..	525,000
Site formation equipment	.. ..	.. ..	100,000
Sewers and sewage disposal:	disposal plant	$100,000	
	1 mile soil drains:	10,000	110,000
Electrical installation (15% building costs)	.. ..		830,500
Water supply	.. ..	.. .. ..	500,000
Boundary walls and gates (2 miles)	.. ..	..	100,000
Covered ways—$100 per yard run	.. ..	..	100,000
			7,941,132
	Contingencies 5%	..	397,056
	Total	..	8,338,188

1,000 beds: say $8,400 per bed = £1,000.

APPENDIX *A—continued*

HOSPITAL QUARTERS

			$
Senior Quarters:—			
M.O.'s Class II Quarters	.. ..	14	907,452
M.O.'s Class III Quarters	.. ..	9	506,889
M.O.'s Class IV Quarters	.. ..	9	408,339
Matron Class IV Quarters	.. ..	1	45,371
Secretary IV Quarters	.. ..	1	45,371
Junior Mess:—			
36 Flats for married officers	.. ..		1,810,908
Mess for 18 single rooms	.. ..		358,568
Nursing Staff Quarters:—			
5 Asst. Matrons and 70 Sisters	.. ..		926,607
60 Nurses single rooms	.. ..		432,571
400 Nurses double rooms	.. ..		2,171,574
Dressers Quarters:—			
70 Married dressers	.. ..		1,334,495
34 single quarters	.. ..		153,412
Medical students 20	.. ..		165,189
Night quarters 20 (Air conditioned)	.. ..		62,188
Hospital servants 570 single rooms	.. ..		2,055,024
Garages:—			
20 open garages	.. ..		20,110
5 heavy garages	.. ..		9,475
26 light garages	.. ..		31,998
30 light garages with quarters over	.. ..		115,635
			11,561,176
Additional for electrical installation (10% building costs)		..	1,000,000
			12,561,176
Contingencies 5%		..	628,058
Total for quarters		..	13,189,234
Hospital and services		..	8,285,688
TOTAL		..	21,474,922

Say $21,500,000 or $21,500 per bed = £2,600.

APPENDIX B

WARDS

STAFF REQUIRED FOR A TEACHING HOSPITAL OF 1,000 BEDS FOR ACUTE GENERAL MEDICINE AND SURGERY

Units	No. of Beds	Senior Specialist	Junior Specialists	Registrars	H.S. or H.P.	Sisters	Staff Nurses	Trained Nurses	Probation Nurses	Hospital Servants	Total
Surgical I	125	1	1	2	4	1 + 5	5	10	40	30	99
Surgical II	125	1	1	2	4	1 + 5	5	10	40	30	99
Surgical III	125	1	1	2	4	1 + 5	5	10	40	30	99
Surgical Physiotherapy ..	50	..	..	..	..	..	..	..	..	..	..
Medical I	125	1	2	2	4	1 + 4	4	8	32	30	88
Medical II	125	1	2	2	4	1 + 4	4	8	32	30	88
Medical III	125	1	2	2	4	1 + 4	4	8	32	30	88
Eyes I	60	1	1	..	2	1 + 3	3	6	24	15	56
E. N. T.	60	1	1	..	2	1 + 3	3	6	24	15	56
Children	130	1	1	2	4	1 + 3	8	16	60	30	126
Total ..	1,050	9	12	14	32	45	41	82	324	240	799 + 1 Anæsthetist

APPENDIX *B—continued*

ADMINISTRATION

Chief Medical Officer	1
Secretary, General Hospital	1
Almoner and Staff	1+2.
Confidential Clerk to S.G.H.	1
Chief Clerk	1
Financial Clerk	1
General Clerks	18
Bill Collectors	1
Office Peons	7
Total ..	32

Resident Students	20
H.A. Office	2 dressers.
Physiotherapy	1 dresser.
Stewards Department	4 dressers.
Transport	1 dresser.
Statistics	3 dressers.
"A" Theatre	1 dresser.
"X" Ray	1 dresser.
Fieldwork	1 dresser.
Clinical Lab.	4 dressers.
Eye Clinic	1 dresser.

DEPARTMENT OF PATHOLOGY

1. Medical Officers	Government Pathologist ..	1	5
	Bacteriologist	1	
	Assistant Pathologist	3	
2. Laboratory Assistants			12
3. Clerk			1
4. Attendants			10
Total ..			28

BLOOD TRANSFUSION SERVICE

Medical Officer	1
Supervisors (female)	2
Technicians (male)	4
Technicians (female)	2
Clerk	1
Driver	1
Attendants	3
Total ..	14

APPENDIX *B—continued*

RADIOLOGY.

Specialist	1
Assistant Specialist	1
Radiographers (women)	4
Trained Nurse	2
Attendants	8
Typist	1
Clerk	1
Dark Room Techs.	2

"X"-Ray Therapy.

Rad. Ther. Specialist	1
Physicist	1
Radiotherapists (women)	3
Trained Nurse	2
Typist	1
Clerk	1
Attendants	6

Radium Therapy.

Technician (Male)	1

MATRONS STAFF

Principal Matron	1	
Grade "A" Matrons	2	
Grade "B" Matrons	2	(1 Home Matron + 2 Asst. Sisters + 1 Staff Nurse. 1 Linen and Laundry + 2 Staff Nurses.)

SISTERS HOSTEL

For 64 Sisters:	Amahs	20		
	Cooks	4		
	Boys	10		
	Peons	1		
	Coolies	6	Kebuns ..	6

APPENDIX *B—continued*

NURSES HOME

For 450 Nurses:	Amahs	.. ..	50
	Cooks	.. ..	10
	Boys	.. ..	20
	Peons	.. ..	1
	Coolies	.. ..	10

OUT-PATIENTS

Senior House Surgeons	.. ..	2
Staff Nurses	.. .. ..	2
Nurses	.. ..	5
Amahs	.. ..	6
Dressers (including Admissions)	..	15 + 2 Relief.
Attendants (including Admissions)	..	26
Dispensers + Dressers	.. ..	11 } Dispensary.
Attendants	.. .. ..	12 }
Dressers	.. .. ..	3 } Surgical Store.
Attendants	.. .. ..	4 }
Drivers	.. ..	21
Watchmen	.. .. ..	22
Kebuns	.. ..	25

BOILER ROOM.

Boilermen	.. .. ..	2
Hospital Servants	.. .. ..	3

KITCHENS

Dietician	.. .. ..	1
Housekeeper Mat.	.. .. ..	1
Sister	.. ..	1
Stewards	.. .. ..	2 + 2 dressers.
Cooks	.. ..	27

MEDICAL AND SURGICAL PHYSIOTHERAPY

Medical	.. .. ..	1 Sister Specialist.
		1 Masseur or Masseuse.
Surgical (50 beds)	.. .. ..	1 Sister Specialist.
Dressers	.. .. ..	2
Trained Nurse	.. .. ..	2
Attendants	.. .. ..	12

APPENDIX *B—continued*

STAFF OF DENTAL DEPARTMENT, COLLEGE OF MEDICINE AND DENTAL CLINIC ON ITS PRESENT COMMITMENTS

Post	*No.*	*College/ Hospital*	*Remarks*
Professor of Dental Surgery ..	1	College	
Professor of Prosthetics (Vice-Lecturer in D. Mechanics) ..	1	College	
Lecturer in Dental Anatomy and Orthodontics	1	College	New appointment for 1947 (not yet approved)
Lecturer in Odontology ..	1	College	New appointment for 1948.
Dental Officer, General Hospital	1	Hospital	
Asst. Dental Officer ,,	1	Hospital	
Tutors in Dental Surgery ..	3	College	Temporary European post—normal local appointment.
Asst. Dental House Surgeons ..	4	Hospital	New Grade six months each. Temporary to be two on full scale.
Instructor in Dental Mechanics ..	1	College	
Dental Mechanics	4	College 2 Hospital 2	1 new appointment 1948.
Lab. Assistants	2	College	1 new appointment for 1947 approved.
Dresser-Storekeeper ..	2	Hospital	1 new appointment for 1948.
Clerk	1	Hospital	
Staff Nurse or Sister ..	1	Hospital	
Nurses	2	Hospital	
Probationer Nurses	3	Hospital	A new grade is to be proposed, something between an ordinary nurse and an attendant.

APPENDIX C

STAFF REQUIRED FOR 500 BEDDED MATERNITY AND GYNÆCOLOGICAL HOSPITAL, SINGAPORE

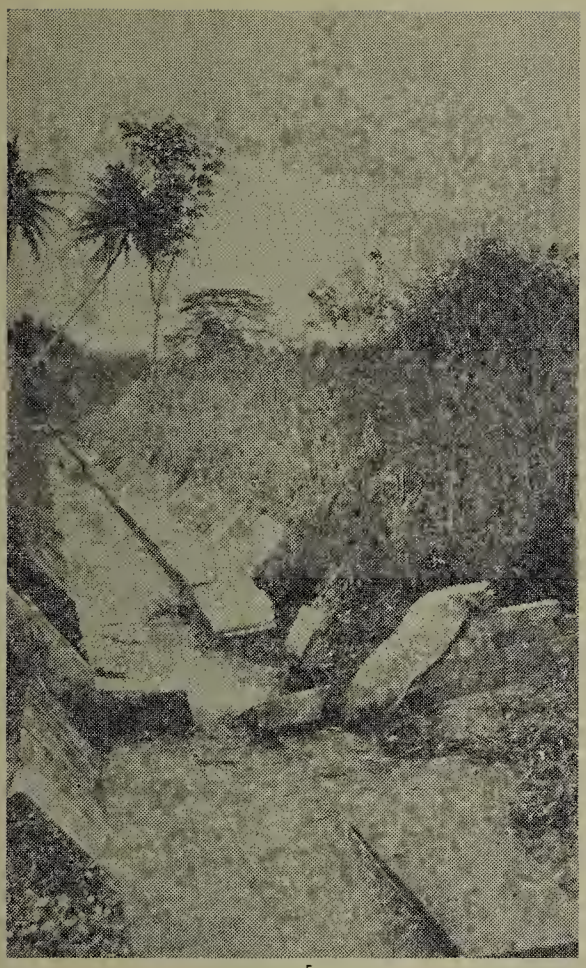
Professor Matron	Assistant Matron	Associate Professor Sister Tutor.
Operation Theatre:	1 Anæsthetist. 2 S/Nurses. 3 Female Attendants.	1 Sister. 3 Nurses. 4 Toties.
Labour Wards (3 wards) 30 beds:	6 Sisters. 12 Nurses. 6 S/Midwives.	6 S/Nurses. 10 Female Attendants.
Gynæcological and Ante-Natal O.P.D.:	2 Doctors. 3 Nurses. 2 Toties.	2 Toties. 1 Sister. 2 S/Nurses. 2 Female Attendants. 1 S/Midwife.
Post-Natal O.P.D.	1 Sister (from Ante-Natal O.P.D.). 1 S/Nurse. 2 Nurses. 1 S/Midwife. 2 Female Attendants.	
Dispensary:	4 Dispensers.	4 Attendants.
Blood Transfusion:	1 Doctor. 2 Female Attendants. 3 Attendants.	1 Sister. 2 S/Nurses or Supervisors. 3 Lab. Technicians.
Laboratories:	1 Doctor. 6 Lab. Technicians.	3 Attendants.
Kitchens:	1 Steward.	1 Sister. 20 Cooks.
Garden:	1 Secretary.	
Admission Room:	3 Trained or S/N. Nurses. 7 Stretcher bearers.	4 Receptionists.
Stores:	1 Storekeeper.	3 Store Attendants.
General Office:	1 Chief Clerk.	10 Clerks.
Sisters' and Nurses Qrs. and Midwives Qrs.:	1 Home Sister. 10 Cooks. 25 Female servants.	10 Table Boys. 5 Male Servants.
Medical Student Qrs.:	1 Cook. 2 Male Servants.	1 Asst. Cook.
Other Staff:	5 Sewing Woman. 1 Electrician. 1 Carpenter.	1 Painter. 1 Plumber.

APPENDIX *C—continued*

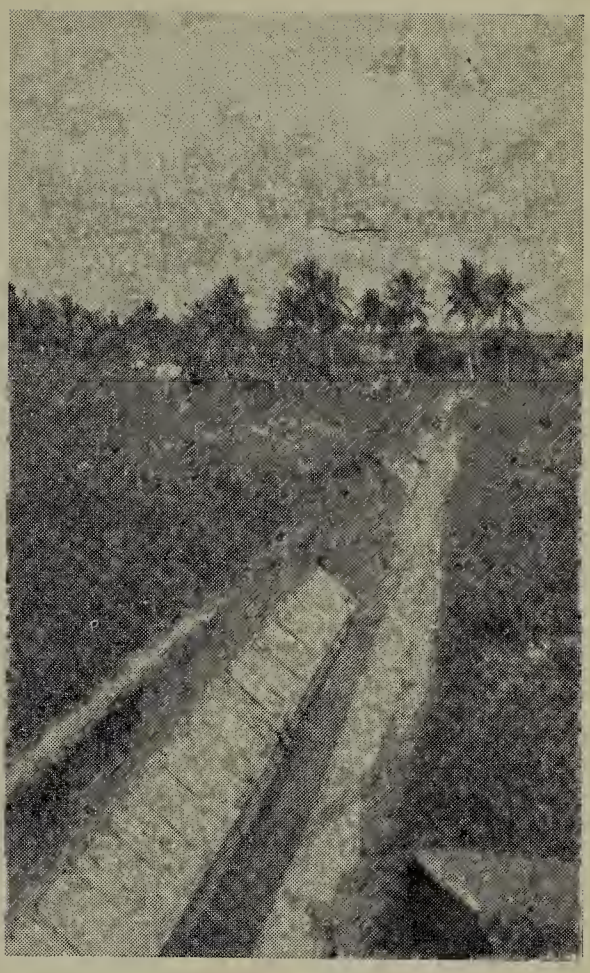
STAFF REQUIRED FOR 500 BEDDED MATERNITY AND GYNÆCOLOGICAL HOSPITAL, SINGAPORE—*continued*

WARDS.	2 Registrars.	
1st Class—35 beds (20 single rooms, 10 double rooms):	2 Doctors. 9 S/Midwives Student 20 Female Attendants. 4 Sisters.	9 S/Nurses. 15 Nurses. 10 Toties.
2nd Class—35 beds. 5 wards (1 Gynæcology) (12 beds in 1 ward):	2 Doctors. 15 S/Midwives Student 80 Female Attendants. 5 Sisters.	18 S/Nurses. 25 Nurses. 20 Toties.
3rd Class—375 beds (40 bedded wards—including Isolation Ward and Ante-Natal Ward—10 Wards) (1 Gynæcology):	4 Doctors. 30 S/Midwives Student. 120 Female Attendants. 14 Sisters.	30 S/Nurses. 50 Nurses. 25 Toties.

PHOTOGRAPHS DEPICTING THE WORK CARRIED OUT BY THE HEALTH DIVISION



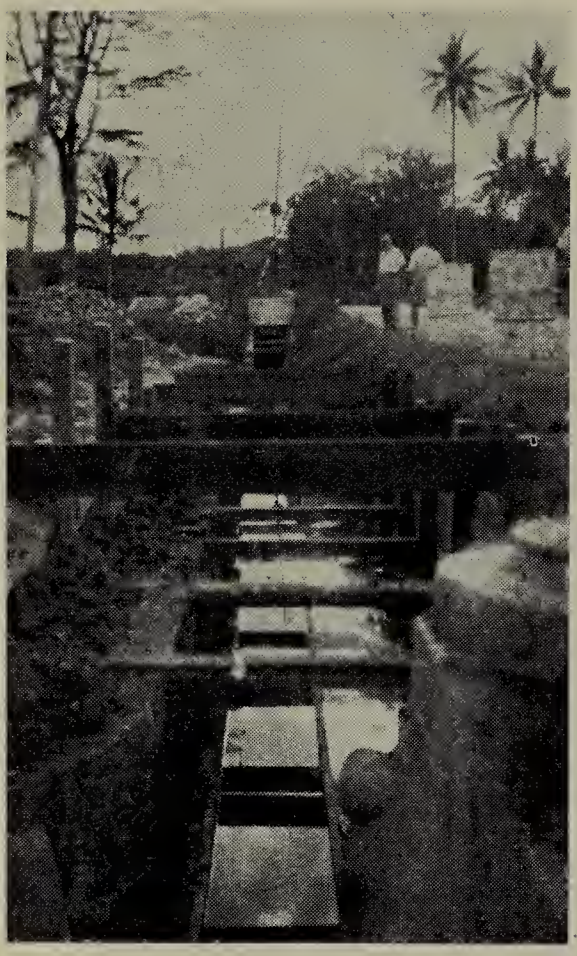
Showing the damage to Anti-Malarial Drain due to lack of maintenance during Japanese occupation.
(Changi Area).



Showing the damage to Anti-Malarial Drain due to lack of maintenance during Japanese occupation.
(Serangoon Area).

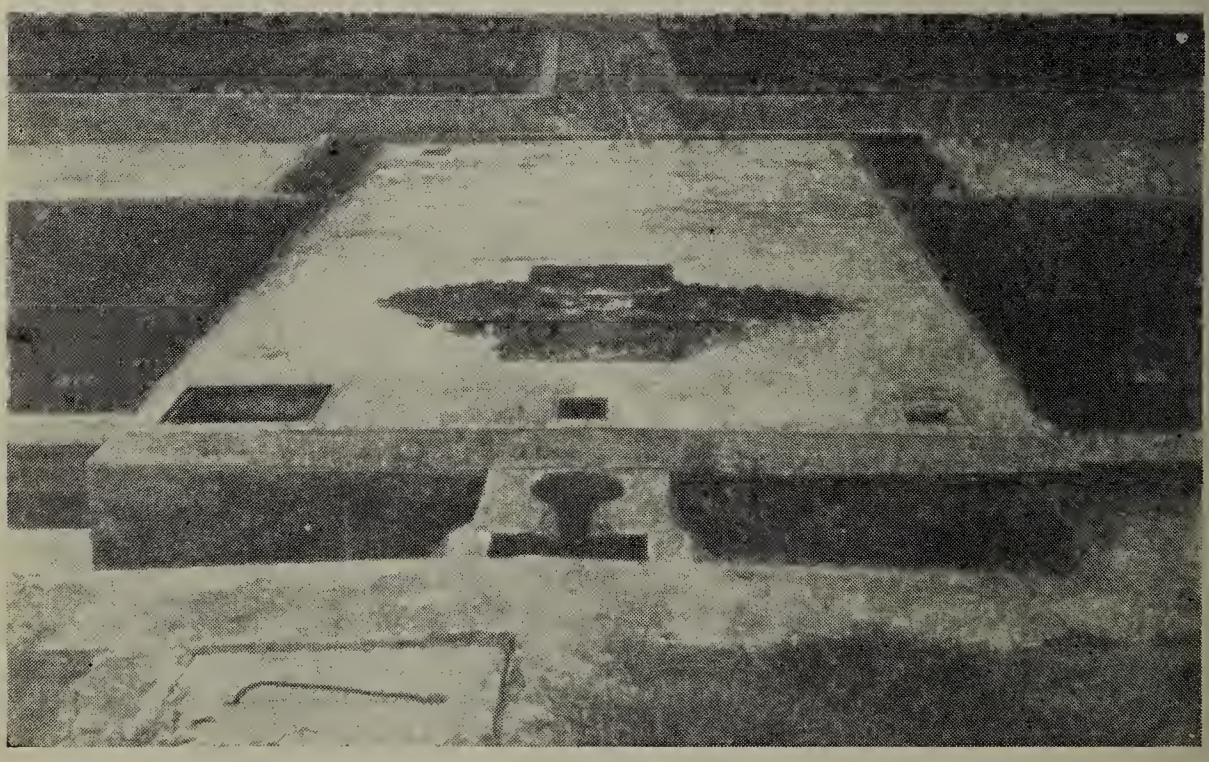
Showing the damage to Anti-Malarial Drain due to lack of maintenance during Japanese occupation.
(Municipal Area).

Showing the damage to Anti-Malarial Drain due to lack of maintenance during Japanese occupation.
(Municipal Area).



Showing damage to main outlet of Anti-Malarial Drain. Now in process of reconstruction.
(Bukit Panjang Area).

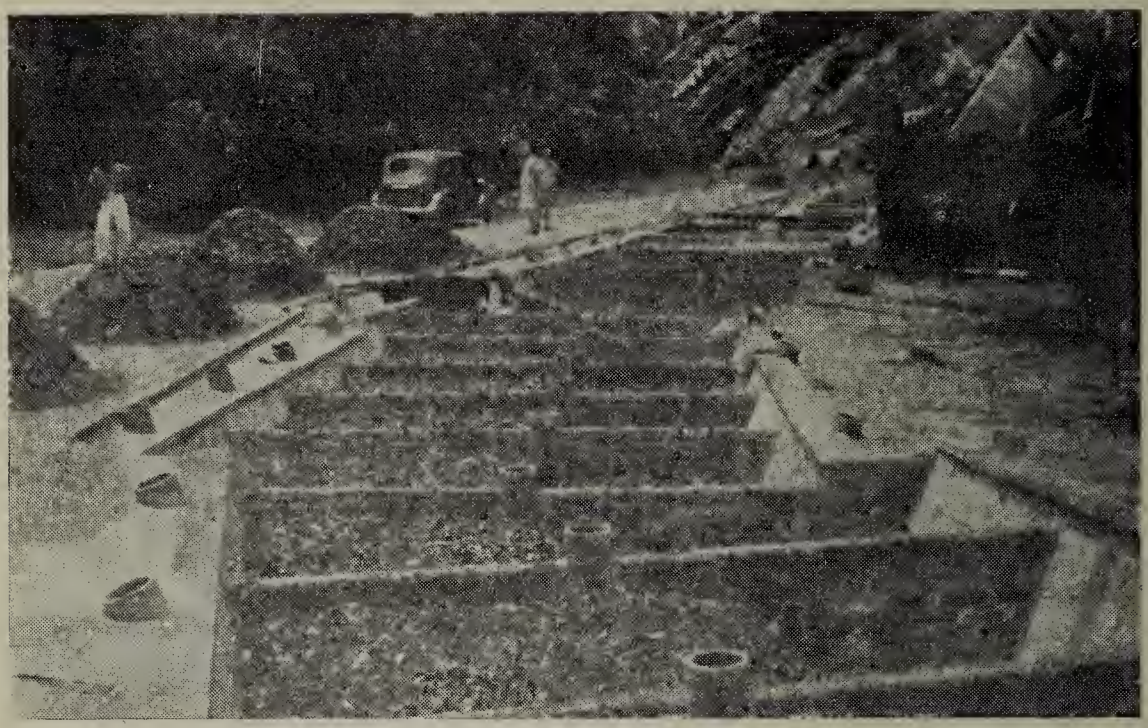
Showing damage to main outlet of Anti-Malarial Drain. Now in process of reconstruction.
(Bukit Panjang Area).



Septic Tank formerly used in Rural Areas for Night-soil disposal; now converted into Anti-Malarial Oil Tank, as the Night-soil is disposed of by composting.

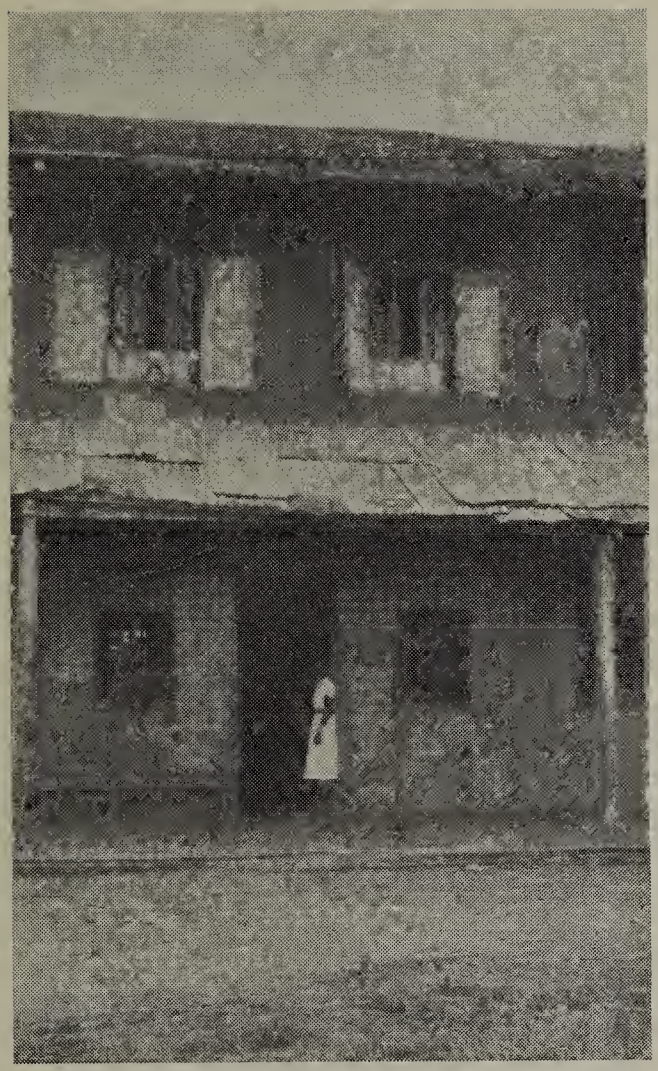
Showing one of the main Anti-Malarial outlets—just repaired (Concrete flume at 12½ m.s. Changi Road).

Anti-Malarial main outlet shown—taken beyond sand dome to prevent silting. (12½ m.s. Changi Road off Tanah Merah).



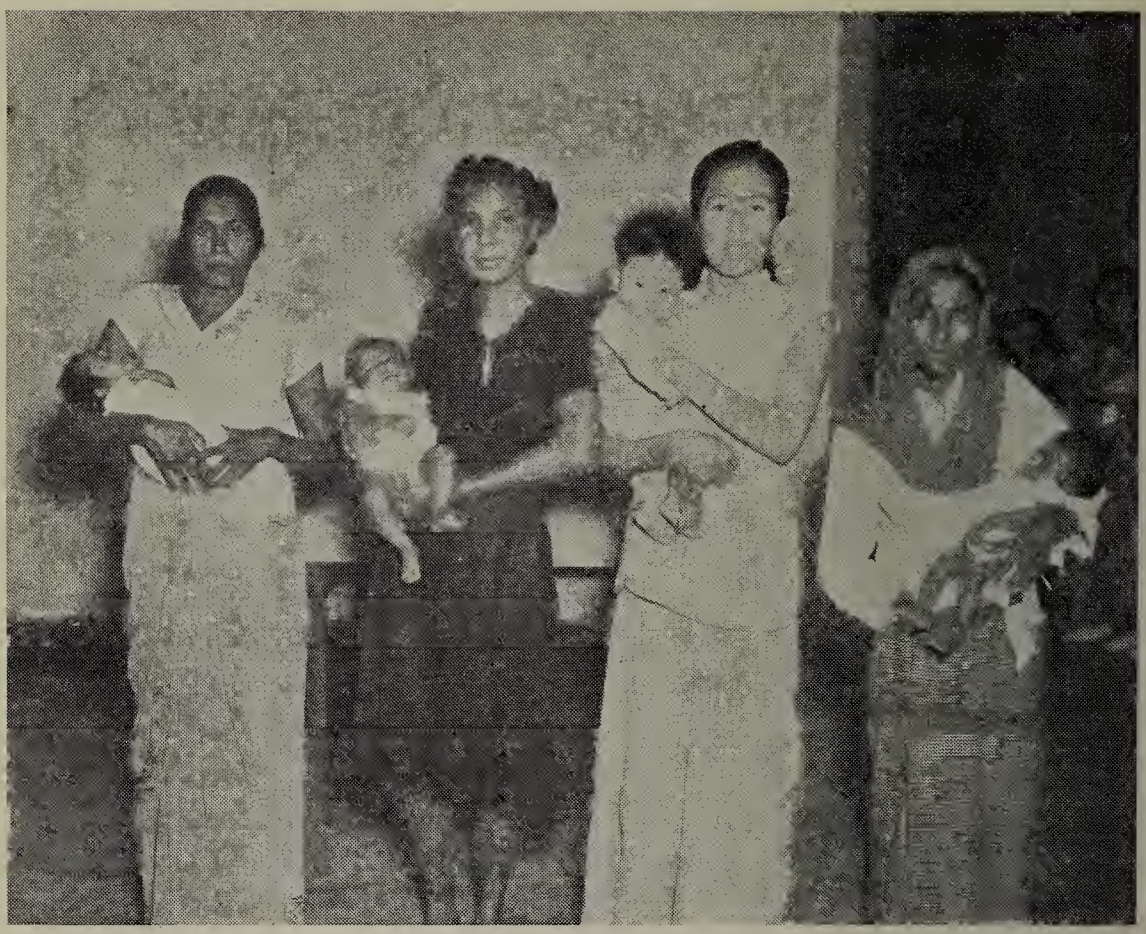
Composting showing "Calcutta Method." Disposal of refuse in Rural Areas is now being utilised for compost.

Composting showing "Indore Method." Now being carried out on a large scale using house refuse from Rural Areas, Singapore.



Bukit Panjang Welfare Centre. Owing to bombing of previous centre this temporary building is at present being used. New site has been selected for new centre and will be built from Public Funds.

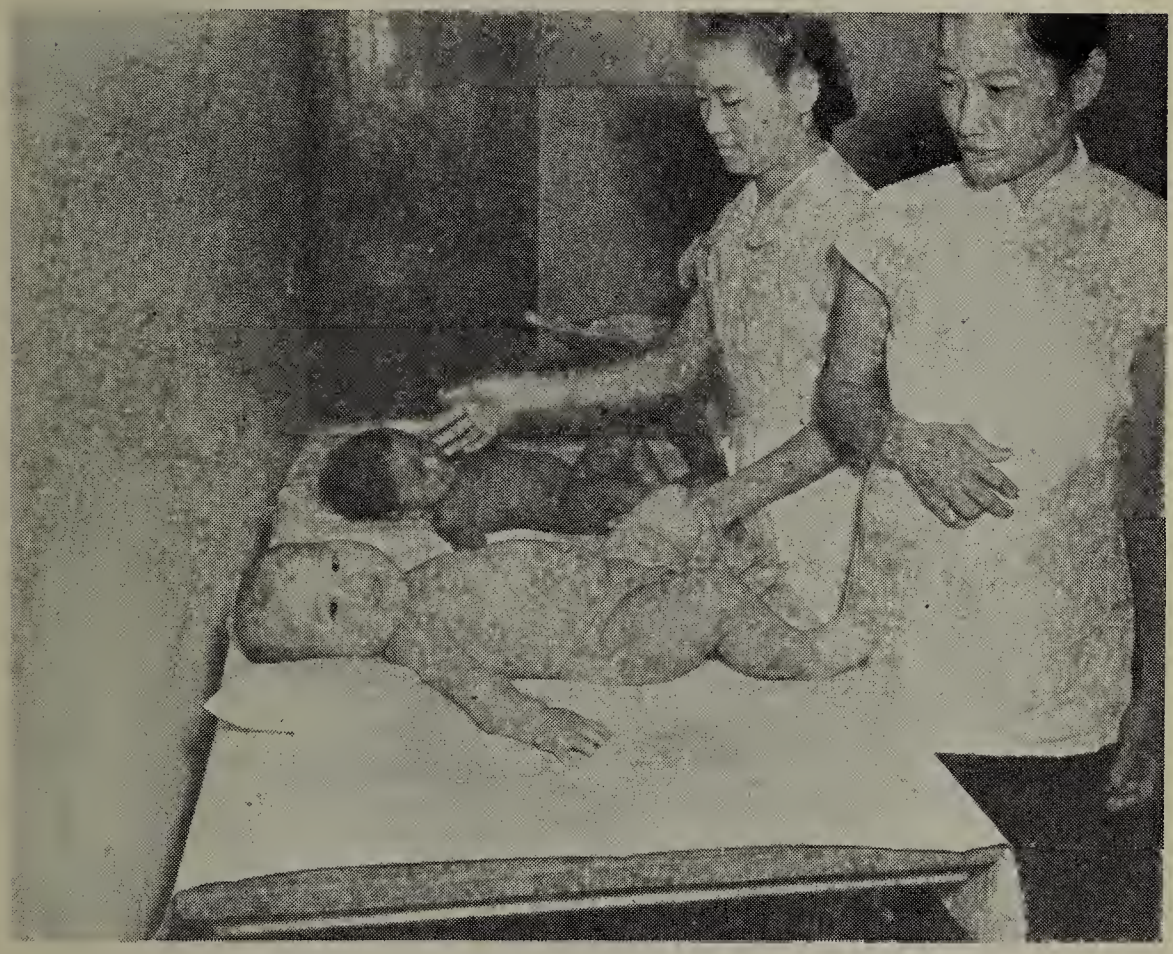
Bukit Timah Welfare Centre. Reopened in 1945.



Nee Soon Maternity and Child Welfare Clinic. New Babies come for advice and treatment.

Nee Soon Maternity and Child Welfare Clinic held in a shop house.

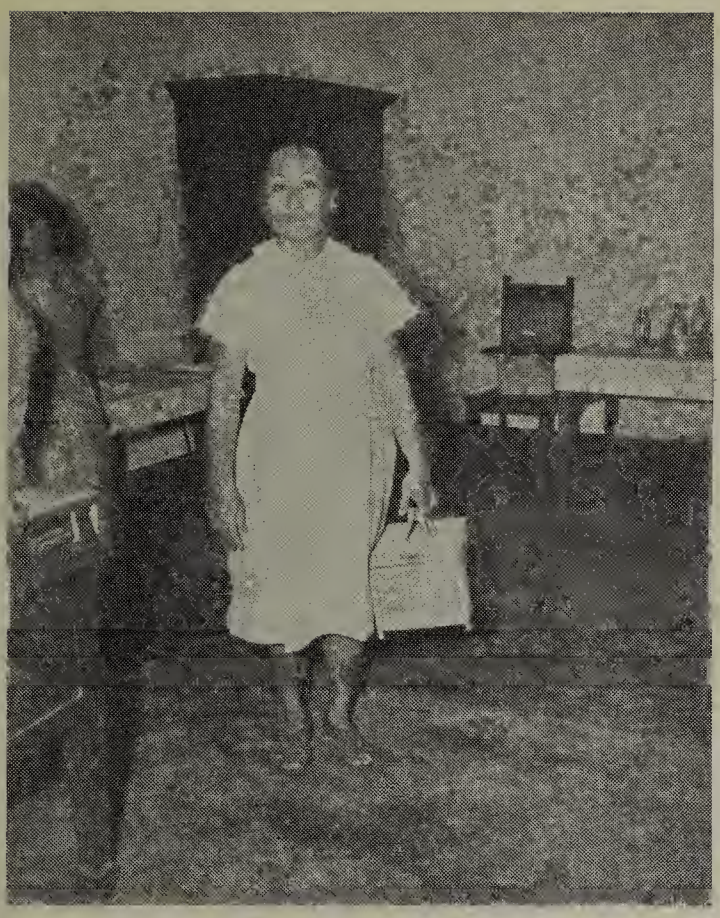
Maternity and Child Welfare Clinic. Weighing the Babies.



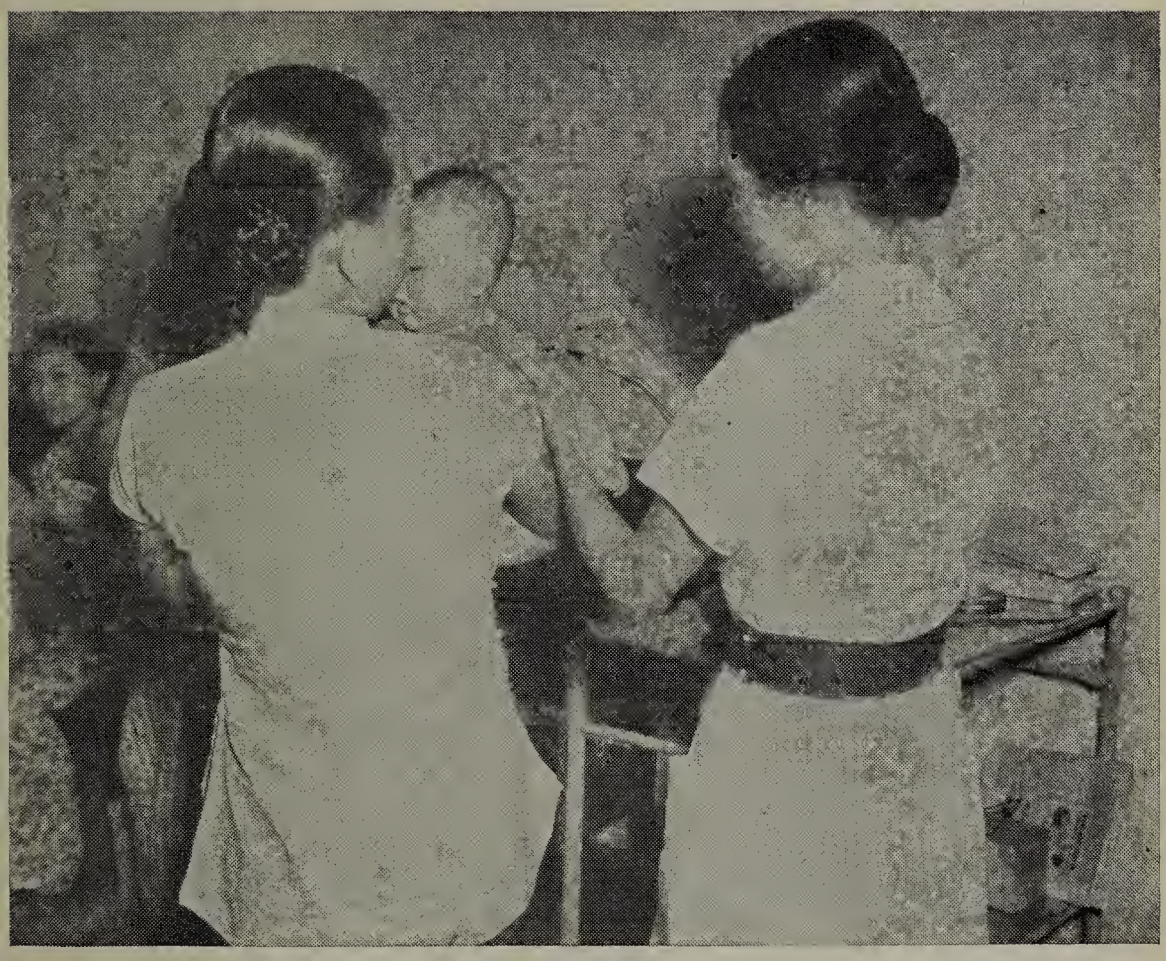
Maternity and Child Welfare Centre. Examination by Nurse after weighing.

Maternity and Child Welfare Clinic. Public Health Matron checking progress.

Maternity and Child Welfare Clinic. A Healthy Specimen.



Maternity and Child Welfare Centre. Nurse setting out to attend to a Maternity Case.

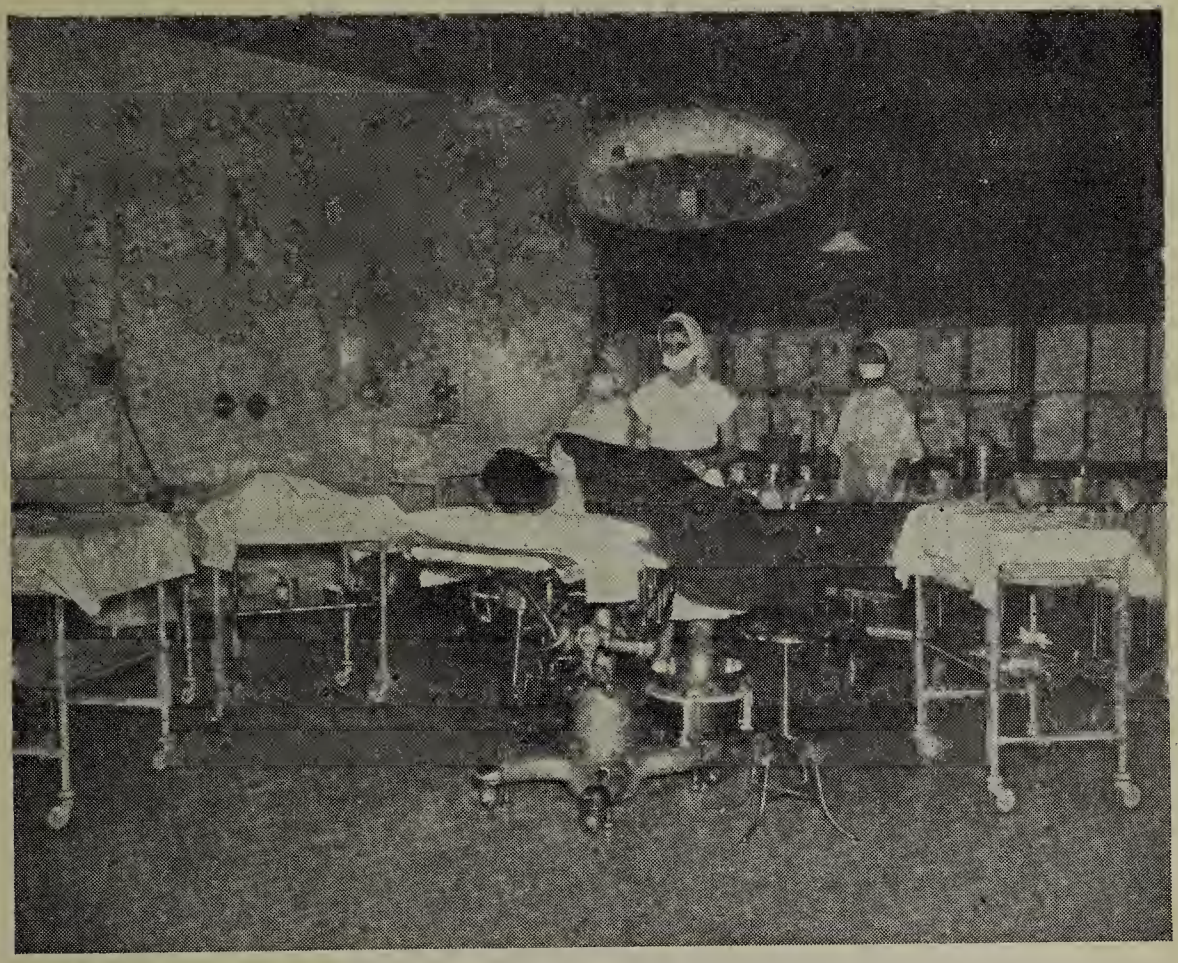


Maternity and Child Welfare Centre. Vaccinating the Baby.

Pupil Nurses at a Preliminary Training Class.

Pupil Nurses at a Practical Demonstration, Preliminary Training Class, General Hospital.

PHOTOGRAPHS DEPICTING THE WORK CARRIED OUT BY THE HOSPITALS DIVISION

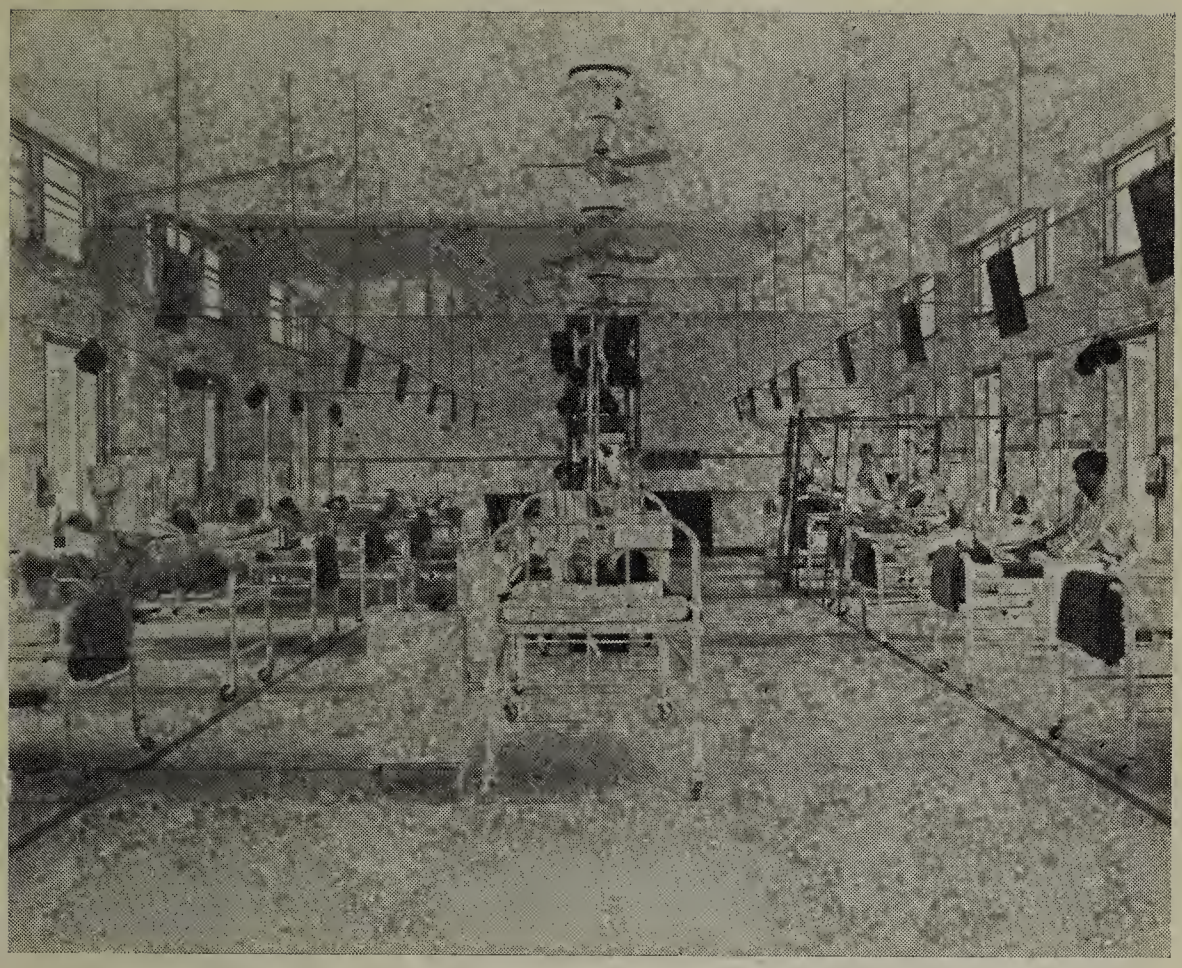


Operating Theatre—General Hospital.

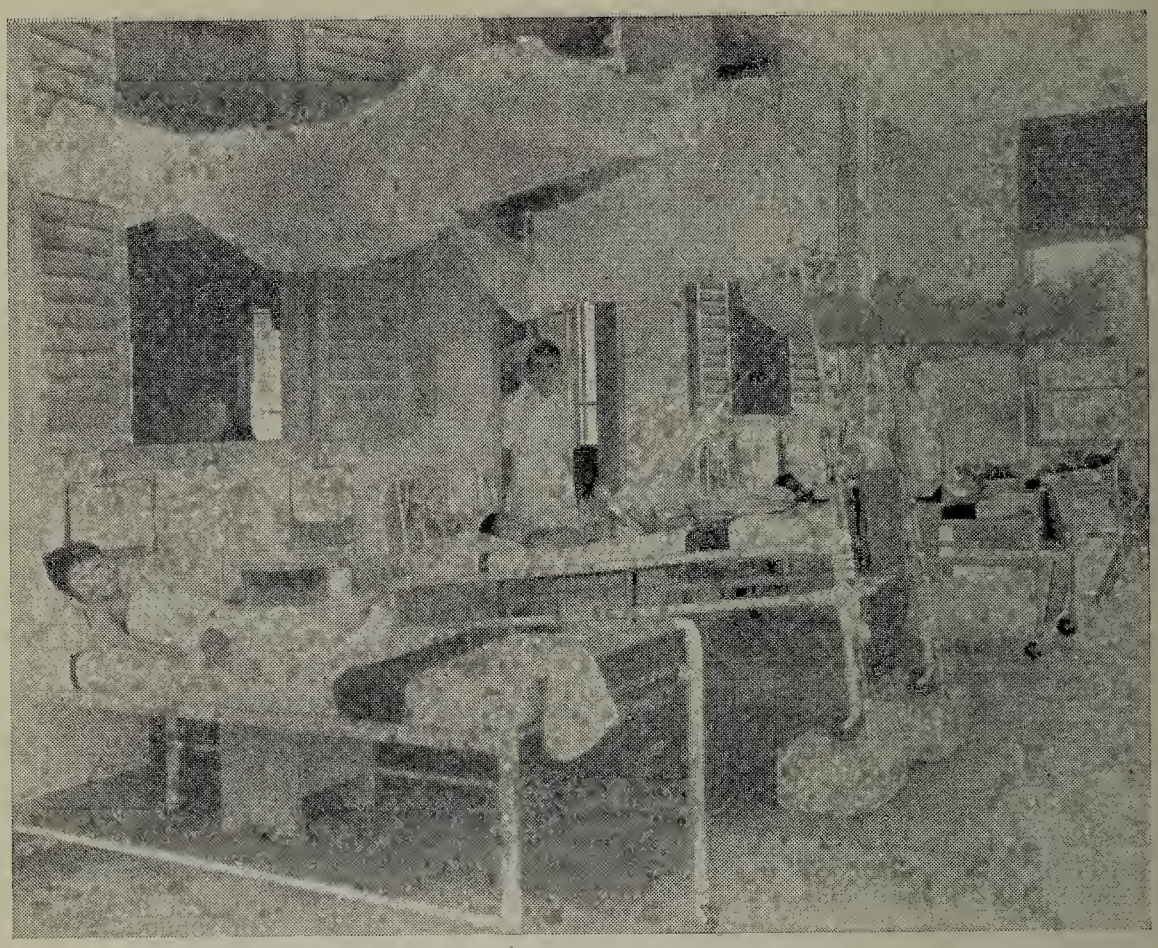
Patients at St. Andrew's Orthopaedic Hospital.

Surgical Ward—General Hospital

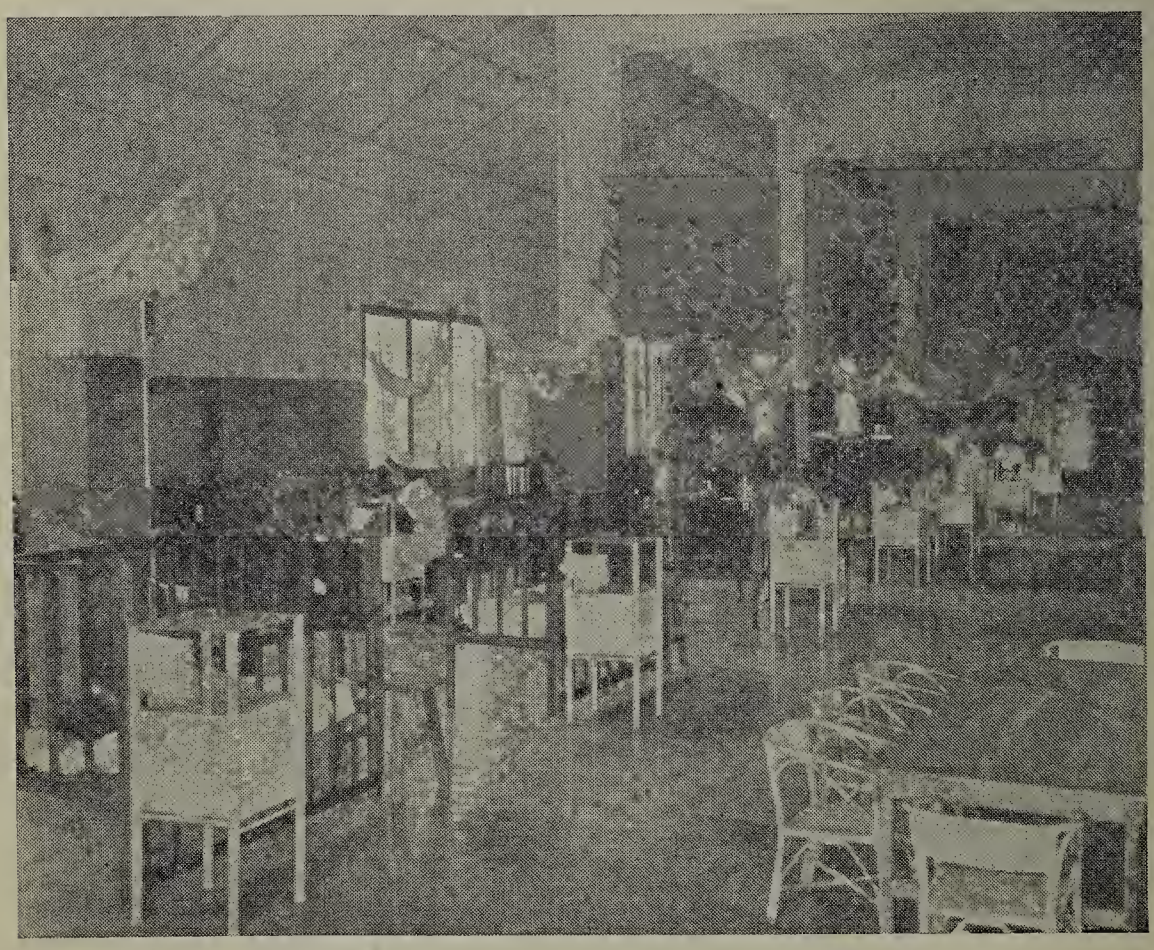
The Exercise Pool at St. Andrew's Orthopaedic Hospital.



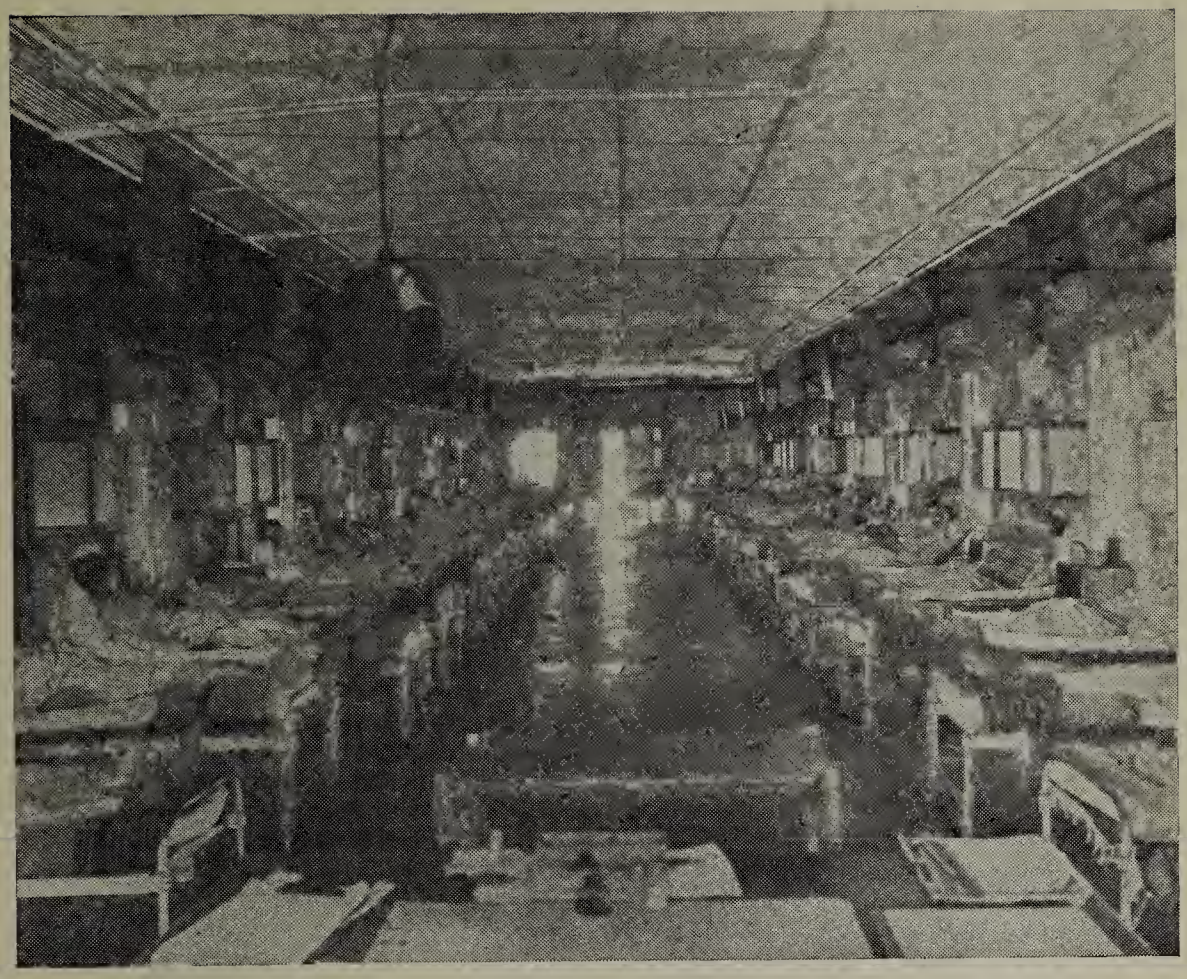
Surgical Wards—General Hospital.



Surgical Ward—General Hospital.



Children's Ward—General Hospital.



Ward for tuberculous male patients, Tan Tock Seng Hospital.

Medical Ward at Tan Tock Seng Hospital.

Bath Hour at the Post-Natal Clinic, Kandang Kerbau Hospital.

Ward for female tuberculous patients, Tan Tock Seng Hospital.

Mothers and Babies at the Post-Natal Clinic, Kandang Kerbau Hospital. Three nationalities are here represented—Chinese, Tamil and Malay.

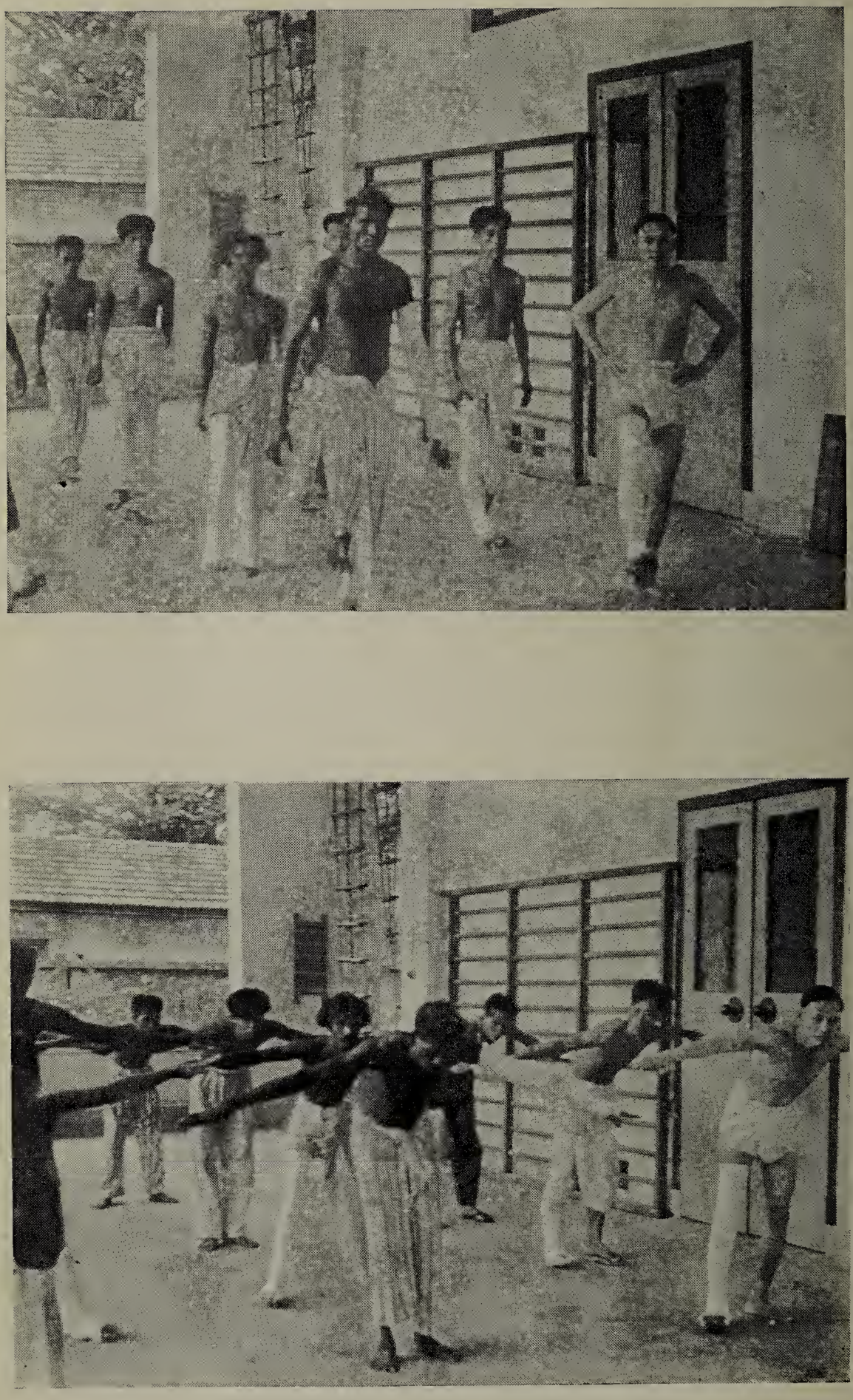
Post-Natal instruction at Kandang Kerbau Hospital.

School Children—Scoliosis.

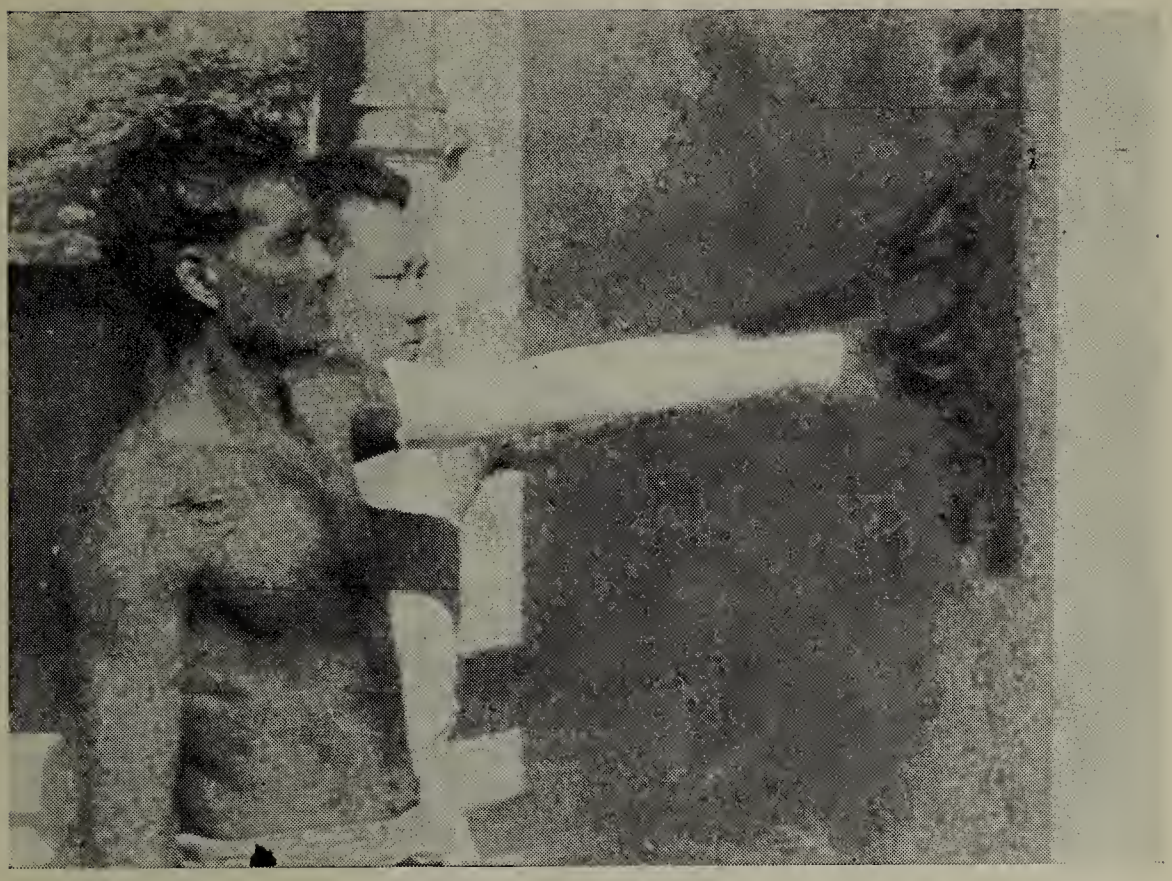
School Children—Scoliosis.

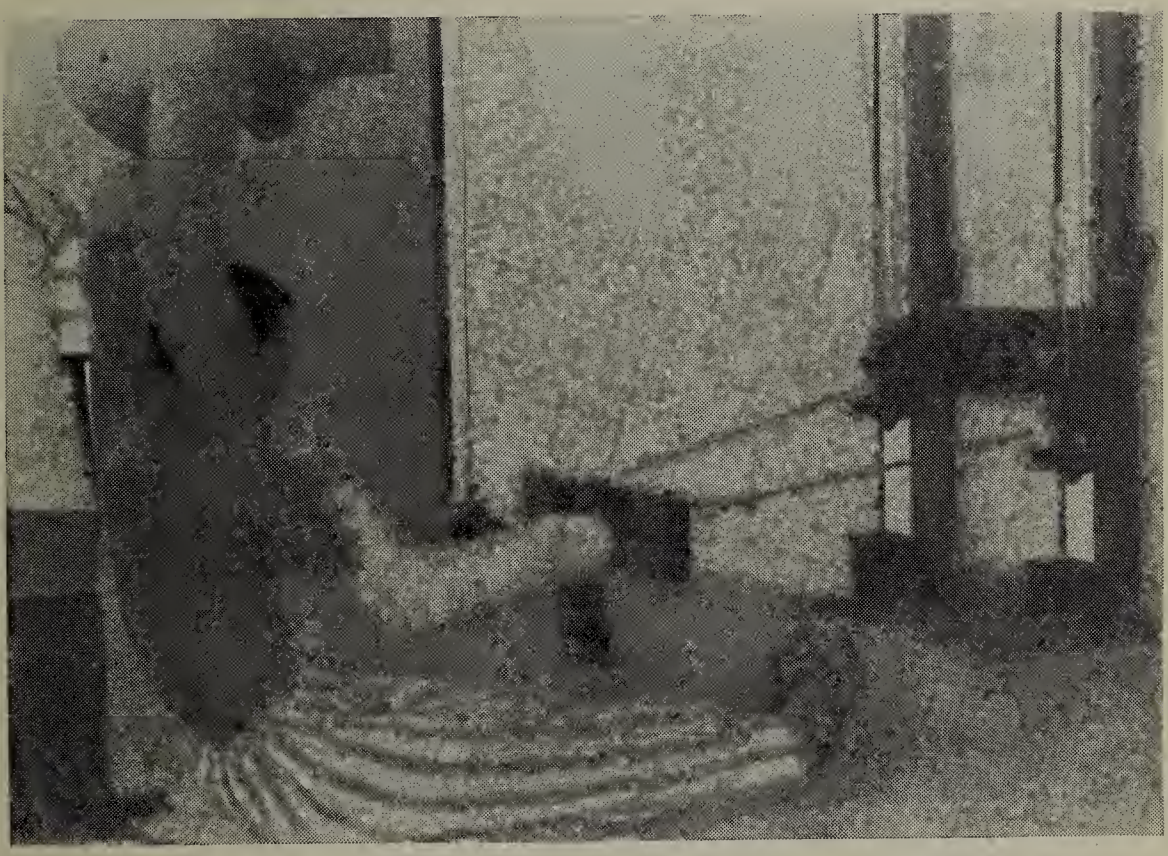
School Children—Scoliosis.

Surgical Physiotherapy—General Class Individual Exercises.



Surgical Physiotherapy—General Class Individual Exercises.





Surgical Physiotherapy—Individual Exercises.

Surgical Physiotherapy—Individual Exercises.

MEDICAL AND HEALTH ACTIVITIES IN SINGAPORE 1946

REFERENCE

Hospitals

Welfare Clinics

Rural Board Villages

Municipal Boundary

Road

1 General Hospital
2 Tan Tock Seng Hospital
3 Middleton Hospital
4 Mental Hospital
5 Leper Settlement
6 Kandang Kerbau Hospital
7 Middle Road Hospital
8 St. Andrew's Orthopaedic Hospital
9 Govt. Medical Store Maxwell Road

SCALE 2 MILES TO 1 INCH

Survey Dept. Malayan Union 134-1947

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